

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

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PATENT & TRADEMARK OFFICE  
S P E N A P T A  
Applicant: Albert Andrew Murrer III  
Title: TRANSPORT CONTAINER  
FOR HAZARDOUS MATERIAL  
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**APPEAL BRIEF**

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Sir:

Applicant (herein, "Appellant") hereby appeals the Final Rejection of claims 6-10, 12-19 and 25. This Appeal Brief follows a Notice of Appeal filed August 7, 2006. Under the provisions of 37 C.F.R. § 41.37, this Appeal Brief is being filed together with a credit card payment form in the amount of \$500.00 covering the 37 C.F.R. 41.20(b)(2) appeal fee. If this fee is deemed to be insufficient, authorization is hereby given to charge any deficiency (or credit any balance) to the undersigned deposit account 50-0872.

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*Table of Contents*

<b>TABLE OF PUBLICATIONS .....</b>	3
<b>REAL PARTY IN INTEREST .....</b>	4
<b>RELATED APPEALS AND INTERFERENCES .....</b>	4
<b>STATUS OF CLAIMS.....</b>	4
<b>STATUS OF AMENDMENTS .....</b>	5
<b>SUMMARY OF CLAIMED SUBJECT MATTER .....</b>	5
<b>GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL.....</b>	8
<b>ARGUMENT .....</b>	9
I.      Rejection of claim 6 and 12-16 under 35 U.S.C. § 103(a).....	9
II.     Rejection of claim 7 and 8 under 35 U.S.C. § 103(a).....	12
III.     Rejection of claim 9 under 35 U.S.C. § 103(a).....	12
IV.     Rejection of claim 10 under 35 U.S.C. § 103(a).....	13
V.      Rejection of claim 16 under 35 U.S.C. § 103(a).....	13
VI.     Rejection of claim 17-19 under 35 U.S.C. § 103(a) .....	15
VII.     Rejection of claim 25 under 35 U.S.C. § 103(a).....	16
<b>CONCLUSION.....</b>	16
<b>APPENDIX A: PENDING CLAIMS .....</b>	18
<b>APPENDIX B: EVIDENCE .....</b>	22

***Table of Publications***

Redzisz <i>et al.</i> , U.S. Patent Publication No. 2003/0136702.....	4, 5, 8
Zeddis, U.S. Patent No. 6,336,342 .....	4, 5, 8, 9, 13, 15, 16
Tattam, U.S. Patent No. 6,609,628.....	4, 8, 12
Boyd-Moss <i>et al.</i> , U.S. Patent No. 6,631,801.....	4, 9
Kalal, U.S. Patent Publication No. 2003/0106895 .....	4, 9, 13
Reichert, U.S. Patent No. 4,865,899.....	5, 9, 13, 14, 15
Travis, U.S. Patent No. 4,585,159 .....	5, 9, 15, 16
KMcHutchison, WIPO Publication No. WO 02/18210 A1 .....	5, 9, 16
<i>In re Rouffet</i> , 149 F.3d 1350, 47 USPQ2d 1453 (Fed. Cir. 1998) .....	9
MPEP §2143.01.....	9, 10
Wolfram Mathworld, <a href="http://mathworld.wolfram.com/Cuboid.html">http://mathworld.wolfram.com/Cuboid.html</a> .....	10
<i>In re Jones</i> , 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992) .....	10
<i>In re Kotzab</i> , 217 F.3d 1365, 55 USPQ2d 1313 (Fed. Cir. 2000).....	10
<i>In re Lee</i> , 277 F.3d 1338, 61 USPQ2d 1430 (Fed. Cir. 2002).....	10
<i>In re Clay</i> , 966 F.2d 656, 23 USPQ2d 1058 (Fed. Cir. 1992).....	14
<i>In re Deminski</i> , 796 F.2d 436, 230 USPQ 313 (Fed. Cir. 1986) .....	14
<i>In re Oetiker</i> , 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992) .....	14
MPEP § 2141.01(a) .....	14
MPEP 2142.....	15, 16

**REAL PARTY IN INTEREST**

The real party in interest in this appeal is Quest Diagnostics Investments Incorporated, which is the assignee of the present application.

**RELATED APPEALS AND INTERFERENCES**

No related appeals or interferences are pending.

**STATUS OF CLAIMS**

Claims 1-10 and 12-25 are pending in the application. Claim 11 has been cancelled. Claims 6-10, 12-19 and 25 are presently under examination, with the remaining pending claims having been withdrawn from examination by the Examiner following a reply to a Restriction Requirement. The pending claims are presented in Appendix A of this Brief.

In the Final Office Action dated May 5, 2006, claims 6 and 12-15 stand finally rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Redzisz *et al.*, U.S. Patent Publication No. 2003/0136702, in view of Zeddies, U.S. Patent No. 6,336,342;

Claims 7 and 8 stand finally rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Redzisz *et al.*, U.S. Patent Publication No. 2003/0136702, and Zeddies, U.S. Patent No. 6,336,342, in view of Tattam, U.S. Patent No. 6,609,628;

Claim 9 stands finally rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Redzisz *et al.*, U.S. Patent Publication No. 2003/0136702, and Zeddies, U.S. Patent No. 6,336,342, as applied to claim 6, in view of Boyd-Moss *et al.*, U.S. Patent No. 6,631,801;

Claim 10 stands finally rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Redzisz *et al.*, U.S. Patent Publication No. 2003/0136702, and Zeddies, U.S. Patent No. 6,336,342, as applied to claim 6, in view of Kalal, U.S. Patent Publication No. 2003/0106895;

Claim 16 stands finally rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Redzisz *et al.*, U.S. Patent Publication No. 2003/0136702, and Zeddies, U.S. Patent No. 6,336,342, as applied to claim 15, in view of Reichert, U.S. Patent No. 4,865,899;

Claim 17-19 stand finally rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Redzisz *et al.*, U.S. Patent Publication No. 2003/0136702, and Zeddies, U.S. Patent No. 6,336,342, as applied to claim 6, in view of Travis, U.S. Patent No. 4,585,159; and

Claim 25 stands finally rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Redzisz *et al.*, U.S. Patent Publication No. 2003/0136702, and Zeddies, U.S. Patent No. 6,336,342, in view of McHutchison, WIPO Publication No. WO 02/18210 A1.

According to the Notice of Panel Decision from Pre-Appeal Brief Review mailed September 14, 2006, the application remains under appeal and proceeds to the Board.

Claims 6-10, 12-19 and 25 are the subject of this appeal.

#### **STATUS OF AMENDMENTS**

In the Final Office Action dated May 5, 2006, the Examiner indicated that the amendment filed February 17, 2006 was entered. In response, a Pre-appeal Brief Request for Review, along with the Notice of Appeal, was filed on August 7, 2006. An adverse Notice of Panel Decision from Pre-appeal Brief Review issued September 14, 2006.

No other amendments or submissions are pending in the application.

#### **SUMMARY OF CLAIMED SUBJECT MATTER**

The claimed subject matter relates in part to a container system for efficiently transporting hazardous material. Transportation of hazardous material often requires specialized packaging to ensure security of the material being transported as well as safety for personnel handling the material. Specification, paragraph [0003]. For example, the transport of biohazardous material,

such as organs for transplant patients, requires that the material be maintained in an environment suitable to prevent contamination of the material, as well as to ensure safety of handlers of the material. *Id.* In this regard, materials such as organs are typically placed in hardened containers that may be thermally insulated. *Id.* The insulation maintains the temperature to preserve the organ while hardening protects the organ from damage such as from handling. *Id.*

Conventional containers for transporting bio-hazardous materials are hardened containers, which take a lot of valuable cargo space when empty. Specification, paragraph [0004]. Used containers are either returned empty to the shipper or are discarded. *Id.* Either approach is costly. *Id.*

To solve the problem, the claimed container has an advantageous design comprising a soft-sided outer shell and an inner frame with rigid walls, both of which are at least partially collapsible. As a result, when the inner frame is placed inside the outer shell, the container will assume an assembled configuration for transporting materials. When the container is empty, the inner frame can be removed from the outer shell. Since both of the outer shell and the inner frame are collapsible, they will occupy vastly less cargo space. See for example, specification, paragraph [0005] and paragraph [0025].

Accordingly, the claimed container system comprises, *inter alia*, a soft-sided outer shell that is at least partially collapsible when unsupported, and an inner frame with rigid walls. Such inner frame is adapted to support the outer shell when inserted inside the outer shell and is at least partially collapsible. Specification, paragraph [0017] and paragraph [0023].

The container system of claim 6, along with that of dependent claims 7-10, 12-19 and 25, requires a soft-sided outer shell that comprises a plurality of vertical walls and a bottom integrally formed and an inner layer formed of watertight material, and a inner frame having rigid walls to support the outer shell when inserted inside the outer shell. The vertical walls and the bottom of the outer shell form an open top, which is covered by a lid adapted to be selectively

secured to the vertical walls. Both the outer shell and the inner frame are at least partially collapsible.

Claim 7, which depends from claim 6, adds the limitation that the hazardous material is positioned within the outer shell. See for example, specification, paragraphs [0006] and [0024].

Claim 8, which depends from claim 7, which in turn depends from claim 6, adds the limitation that the hazardous material includes an organ. See for example, specification, paragraph [0008].

Claim 9, which depends from claim 6, adds the limitation that the outer shell satisfies IATA 602 requirements. See for example, specification, paragraph [0014].

Claim 10, which depends from claim 6, adds the limitation that the soft-sided outer shell includes vent holes. See for example, specification, paragraph [0041].

Claim 12, which depends from claim 6, adds the limitation that a fastener is included to secure the lid to the vertical walls. See for example, specification, paragraph [0021].

Claim 13, which depends from claim 12, which in turn depends from claim 6, adds the limitation that the fastener is a zipper. See for example, specification, paragraph [0021].

Claim 14, which depends from claim 6, adds the limitation that the bottom is structurally reinforced. See for example, specification, paragraph [0021].

Claim 15, which depends from claim 6, adds the limitation that the outer shell includes an outer fabric layer and foam insulation for thermally insulating an interior of the shell from an external environment. See for example, specification, paragraph [0022].

Claim 16, which depends from claim 15, which in turn depends from claim 6, adds the limitation that the outer shell includes a polyester layer and foam insulation for thermally

insulating the interior from the external environment. See for example, specification, paragraph [0022], and paragraph [0035].

Claim 17, which depends from claim 6, adds the limitation that the inner frame comprises a pair of opposing, rigid longitudinal walls and a pair of opposing, collapsible side walls, where each of the side walls linking an end of one of the longitudinal walls to an end of the other of longitudinal wall, the side walls adapted to collapse to allow a reduction in a distance between the longitudinal walls. See for example, specification, paragraph [0023].

Claim 18, which depends from claim 17, which in turn depends from claim 6, adds the limitation that the inner frame further comprises a rigid bottom pivotably engaged to one of the opposing rigid walls, where the rigid bottom adapted to selectively pivot between a first open position and a second collapsed position. See for example, specification, paragraph [0023].

Claim 19, which depends from claim 17, which in turn depends from claim 6, adds that limitation that the inner frame further comprises a fastener to secure the side walls in a collapsed position. See for example, specification, paragraph [0023].

Claim 25, which depends from claim 6, adds that limitation that the outer shell is capable of withstanding an internal pressure which produces a pressure differential of not less than 95kPa (0.95 bar, 13.8lb/in<sup>2</sup>) in the range or -40°C to +55°C (-40°F to 130°F). See for example, specification, paragraph [0067].

#### **GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

1. The rejection of claim 6 and 12-16 under 35 U.S.C. §103(a), as being obvious over Redzisz *et al.*, U.S. Patent Publication No. 2003/0136702 (hereinafter “Redzisz”), in view of Zeddies, U.S. Patent No. 6,336,342 (hereinafter “Zeddies”).
2. The rejection of claim 7 and 8 under 35 U.S.C. §103(a), as being obvious over Redzisz and Zeddies in view of Tattam, U.S. Patent No. 6,609,628 (hereinafter “Tattam”).

3. The rejection of claim 9 under 35 U.S.C. §103(a) as being obvious over Redzisz and Zeddies as applied to claim 6, in view of Boyd-Moss *et al*, U.S. Patent No. 6,631,801 (hereinafter “Boyd-Moss”).

4. The rejection of claim 10 under 35 U.S.C. §103(a), as being obvious over Redzisz and Zeddies in view of Kalal, U.S. Patent Publication No. 2003/0106895 (hereinafter “Kalal”).

5. The rejection of claim 16 under 35 U.S.C. §103(a), as being obvious over Redzisz and Zeddies in view of Reichert, U.S. Patent No. 4,865,899 (hereinafter “Reichert”).

6. The rejection of claims 17-19 under 35 U.S.C. §103(a), as being obvious over Redzisz and Zeddies in view of Travis, U.S. Patent No. 4,485,159 (hereinafter “Travis”).

7. The rejection of claim 25 under 35 U.S.C. §103(a), as being obvious over Redzisz and Zeddies, in view of McHutchison (hereinafter “McHutchison”).

## **ARGUMENT**

### I. Rejection of claim 6 and 12-16 under 35 U.S.C. § 103(a)

Appellant respectfully submits that the Examiner has failed to establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a) for claim 6 and 12-16 over Redzisz in view of Zeddies *inter alia* because the motivation to combine these two references is lacking.

Pursuant to MPEP §2143.01, "there are three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art." *In re Rouffet*, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457-58 (Fed. Cir. 1998) ("the combination of the references taught every element of the claimed invention, however without a motivation to combine, a rejection based on a *prima facie* case of obvious was held improper.")

MPEP §2143.01 further requires that there must be “some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the reference themselves or in the knowledge generally available to one of ordinary skill in the art” to establish *prima facie* obviousness. *In re Kotzab*, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000), *In re Lee*, 277 F.3d 1338, 1342-44, 61 USPQ2d 1430, 1433-34 (Fed. Cir. 2002), *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

As addressed in further detail below, Appellant submits that there is no suggestion in either Redzisz or Zeddis to combine the teachings as there is no need for an additional (duplicative) rigid inner frame for Redzisz’s container.

According to the Examiner, “Redzisz discloses a container [citations] with a collapsible soft sided outer shell, a plurality of vertical walls and a bottom integrally formed, an inner layer of watertight material [citations] [and] a secured lid to the side walls [citations].” Final Office Action page 2. This description of Redzisz, however, is lacking in certain critical details.

As depicted in the figures, Redzisz discloses a collapsible insulated cooler “in the form of a rectangular parallelepiped enclosure.” Redzisz, paragraph [0004], lines 2-3. It is commonly known that a “rectangular parallelepiped<sup>1</sup>,” also known as cuboid, is a closed box composed of three pairs of rectangular faces placed opposite each other and joined at right angles to each other. See, e.g., Wolfram Mathworld, <http://mathworld.wolfram.com/Cuboid.html>. According to Redzisz, the cooler has a bottom side “that is foldable yet maintains its structural integrity and shape when the case is fully opened.” Redzisz, paragraph [0010] (emphasis added).

The nature of the Redzisz cooler that allows for folding is shown in Fig. 11, which depicts the foldable bottom side as being divided into equally sized panels 72 and 74, which “have a shape and configuration defined by semi-rigid or rigid plate members 76 and 78.”

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<sup>1</sup> A closed box composed of three pairs of rectangular faces placed opposite each other and joined at right angles to each other.

Redzisz, paragraph [0034]. The cooler is foldable along a central longitudinal line (seam line 80, Fig. 11), which is the border between panels 72 and 74. The cooler is held in a fully collapsed mode by connectors 104 and 106 attached to straps 100 and 102 on the front, cooperating with connectors 86 and 88 attached to straps 90 and 92 on the back side of the case, respectively. Redzisz, paragraph [0035] and figure 8.

It is thus clear from a proper reading of Redzisz that the cooler is designed with sufficient inner structural rigidity resulting at least in part from an inner frame (see Fig. 11, plates 76 and 78) so that the cooler maintains its shape as a “rectangular parallelepiped” when fully opened. This is consistent with all the figures which show that the cooler with rigid sides in its open configuration and is supported the description of connectors and straps for holding the cooler in a collapsed state.

The Examiner’s characterization of Redzisz as having a collapsible “soft sided” outer shell” mischaracterizes the Redzisz cooler design. Redzisz not only does not refer to any “soft-sided” outer shell but rather describes something entirely different -- a cooler with a built in rigid frame.

Appellant respectfully submits that the built in rigid frame of the Redzisz cooler, unacknowledged by the Office Action, defeats the alleged motivation to combine this cooler with the removable and collapsible rigid inner frame of Zeddies. One of ordinary skill would not be motivated to add a second (duplicative) rigid inner frame to a cooler that already has sufficient inner support to maintain its rectangular cooler shape when fully opened.

Furthermore, as seen in Fig. 11, the Redzisz cooler with its integral inner rigid frame has a foldable bottom side being divided into equally sized panels 72 and 74, which “have a shape and configuration defined by semi-rigid or rigid plate members 76 and 78.” Redzisz, paragraph [0034]. The cooler is foldable along a central longitudinal line (seam line 80, Fig. 11), which is the border between panels 72 and 74. These features of the Redzisz cooler allow it to maintain its structural integrity and shape when fully opened yet be collapsible upon the addition of

external force without having to remove the inner rigid frame from the container. To combine the removable rigid inner frame of Zeddies with the cooler of Redzisz, as the Examiner would have it, runs counter to the purpose of the Redzisz cooler design.

Because motivation to combine the primary and secondary reference is lacking, Appellant respectfully requests that the pending obviousness rejection of claim 6 and 12-16 be withdrawn or reversed.

II. Rejection of claim 7 and 8 under 35 U.S.C. § 103(a)

Appellant respectfully submits that the Examiner has failed to establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a) for claim 7 and 8 over Redzisz and Zeddies in view of in view of Tattam.

Tattam is cited solely for the use of an insulated container for transporting hazardous material such as an organ. Tattam is not cited for and does not cure the defect in the lack of motivation to combine the primary and secondary reference.

Thus, the rejection *inter alia* fails because it lacks a motivation to combine the teachings of Redzisz with that of Zeddies as discussed above in the rejection of claims 6 and 12-16. For this reason, the pending obviousness rejection of claim 7 and 8 should be withdrawn or reversed.

III. Rejection of claim 9 under 35 U.S.C. § 103(a)

Appellant respectfully submits that the Examiner has failed to establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a) for claim 9 over Redzisz and Zeddies in view of in view of Boyd-Moss.

Boyd-Moss is cited solely for the disclosure of IATA 602 requirements. Boyd-Moss is not cited for and does not cure the defect in the lack of motivation to combine the primary and secondary reference.

Thus, the rejection *inter alia* fails because it lacks a motivation to combine the teachings of Redzisz with that of Zeddies as discussed above in the rejection of claims 6 and 12-16. For this reason, the pending obviousness rejection of claim 9 should be withdrawn or reversed.

IV. Rejection of claim 10 under 35 U.S.C. § 103(a))

Appellant respectfully submits that the Examiner has failed to establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a) for claim 10 over Redzisz and Zeddies, in view of Kalal.

Kalal is cited solely for the disclosure of vent holes in the outer shell of a soft sided collapsible container. Kalal is not cited for and does not cure the defect in the lack of motivation to combine the primary and secondary reference.

Thus, the rejection *inter alia* fails because it lacks a motivation to combine the teachings of Redzisz with that of Zeddies as discussed above in the rejection of claims 6 and 12-16. For this reason, the pending obviousness rejection of claim 10 should be withdrawn or reversed.

V. Rejection of claim 16 under 35 U.S.C. § 103(a)

Appellant respectfully submits that the Examiner has failed to establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a) for claim 16 over Redzisz and Zeddies, in view of Reichert.

Reichert is cited solely for a container for hazardous material, the container constructed with polyester. Reichert is not cited for and does not cure the defect in the lack of motivation to combine the primary and secondary reference.

Thus, the rejection *inter alia* fails because it lacks a motivation to combine the teachings of Redzisz with that of Zeddies as discussed above in the rejection of claims 6 and 12-16. For this reason, the pending obviousness rejection of claim 16 should be withdrawn or reversed.

Additionally, claim 16 is patentable on grounds independent from those already discussed.

Claim 16 requires the cooler to have an outer fabric that includes polyester (specification, page 5, paragraph [0022] and page 8, paragraph [0035]). The final rejection errors in attempting to combine non-analogous art, *i.e.*, the teachings for an underground and above ground bulk storage tank with that of a transport container for biohazardous material.

Pursuant to MPEP § 2141.01(a), "in order to rely on a reference as a basis for rejection of an applicant's invention, the reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned." *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992). See also *In re Deminski*, 796 F.2d 436, 230 USPQ 313 (Fed. Cir. 1986); *In re Clay*, 966 F.2d 656, 659, 23 USPQ2d 1058, 1060-61 (Fed. Cir. 1992)

The Examiner argues that that Reichert discloses a container for the transport of hazardous materials constructed from fabric comprising polyester. Office Action, page 4. It is further argued that use of polyester is selected for its high degree of imperviousness to hazardous materials and that such knowledge constitutes a motivation to combine with the teachings of Redzisz and Zeddies. Office Action, page 7, lines 1-5.

Reichert, however, discloses the use of polyester in the "underground and above ground bulk storage tanks' and for the storage of "diesel fuel, gasoline, chemical solvents, and other volatile and/or corrosive materials." Reichert, column 1, line 16, and lines 45-49, respectively.

By contrast, the present invention is a container for small scale transportation and storage of biohazard materials, *e.g.* "medical-related material," "organs or other body parts," or "radioactive material" (see specification, paragraph [0008]). Quite clearly, the Reichert container and the container of claim 16 differ in the scale of capacity, bulk storage tank *vs.* portable container.

Accordingly, Appellant submits that Reichert is non-analogous art because (1) it is not in the field of the present invention, and (2) it is irrelevant to the problem faced by the inventor.

Thus, in addition to the lack of motivation to combine Redzisz with Zeddies, the rejection also fails in attempting to add Reichert, a further incompatible reference. The Examiner, not applicant, has the initial burden to state a *prima facie* obviousness rejection. MPEP 2142. Accordingly, the rejection of claim 16 as being obvious over Redzisz and Zeddies in view of Reichert fails and should be withdrawn or reversed.

VI. Rejection of claim 17-19 under 35 U.S.C. § 103(a)

Appellant respectfully submits that the Examiner has failed to establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a) for claims 17-19 over Redzisz and Zeddies, in view of Travis.

Travis is cited solely as a design for a removable inner rigid frame. Travis is not cited for and does not cure the defect in the lack of motivation to combine the primary and secondary reference.

Thus, the rejection *inter alia* fails because it lacks a motivation to combine the teachings of Redzisz with that of Zeddies as discussed above in the rejection of claims 6 and 12-16. For this reason, the pending obviousness rejection of claim 17-19 should be withdrawn or reversed.

Additionally, claims 17-19 are patentable on grounds independent from those already discussed.

The Examiner asserts that Travis “discloses a frame structure capable [sic] being used as the inner frame of the invention.” Final Office Action, page 5. However, Travis contemplates such design as the container itself and uses an entirely different design for its removable inner rigid frame (see Fig. 4).

Accordingly, there is no motivation from the art to use the collapsible feature of the container design of Travis as a removable collapsible inner rigid frame design other than in hindsight based on Appellant's invention.

Thus, in addition to the lack of motivation to combine Redzisz with Zeddies, the rejection also fails in attempting to add Travis via the improper use of hindsight. The Examiner, not applicant, has the initial burden to state a *prima facie* obviousness rejection. MPEP 2142. Accordingly, the rejection of claim 16 as being obvious over Redzisz and Zeddies in view of Travis fails and should be withdrawn or reversed.

VII. Rejection of claim 25 under 35 U.S.C. § 103(a)

Appellant respectfully submits that the Examiner has failed to establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a) for claim 25 over Redzisz and Zeddies, in view of McHutchison.

McHutchison is cited solely for an insulated container for transporting human organs at pressures other than atmospheric pressure. McHutchison is not cited for and does not cure the defect in the lack of motivation to combine the primary and secondary reference.

Thus, the rejection *inter alia* fails because it lacks a motivation to combine the teachings of Redzisz with that of Zeddies as discussed above in the rejection of claims 6 and 12-16. For this reason, the pending obviousness rejection of claim 25 should be withdrawn or reversed.

**CONCLUSION**

For the reasons discussed above, Appellant respectfully submits that claims 6-10, 12-19 and 25 are in condition for allowance, and respectfully request that the rejections be withdrawn or reversed, and that the claims be allowed to issue.

Respectfully submitted,

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**APPENDIX A: PENDING CLAIMS**

1. (Withdrawn) A method of transporting hazardous material, comprising:
  - providing a container system according to claim 6; and
  - positioning hazardous material into said container system.
2. (Withdrawn) The method according to claim 1, wherein said hazardous material includes an organ.
3. (Withdrawn) The method according to claim 1, wherein said container system satisfies IATA 602 requirements for an outer packaging.
4. (Withdrawn) The method according to claim 1, wherein said soft-sided outer shell of said container system includes vent holes.
5. (Withdrawn) The method according to claim 1, further comprising:
  - removing said hazardous material from said container system; and
  - collapsing said container system.
6. (Previously Presented) A container system, comprising:
  - a soft-sided outer shell, said outer shell comprising a plurality of vertical walls and bottom integrally formed and having an inner layer formed of watertight material, said vertical walls and bottom forming an open top which is covered by a lid adapted to be selectively secured to said vertical walls,
  - wherein said outer shell is at least partially collapsible when unsupported; and
  - an inner frame having rigid walls;
  - wherein said inner frame is adapted to support said outer shell when said inner frame is inserted inside said outer shell;
  - wherein said inner frame is at least partially collapsible.

7. (Original) The container system according to claim 6, further comprising hazardous material positioned within said outer shell.
8. (Original) The container system according to claim 7, wherein said hazardous material includes an organ.
9. (Original) The container system according to claim 6, wherein said outer shell satisfies IATA 602 requirements for an outer packaging when supported from within by said inner frame.
10. (Original) The container system according to claim 6, wherein said soft-sided outer shell includes vent holes.
11. (Cancelled)
12. (Previously Presented) The container system according to claim 6, further comprising a fastener to secure said lid to said vertical walls.
13. (Original) The container system according to claim 12, wherein said fastener is a zipper.
14. (Currently amended) The container system according to claim 6, wherein said bottom is structurally reinforced.
15. (Original) The container system according to claim 6, wherein said outer shell includes an outer fabric layer and foam insulation for thermally insulating an interior of said shell from an external environment.
16. (Original) The container system according to claim 15, wherein said outer fabric includes polyester.
17. (Original) The container system according to claim 6, wherein said inner frame comprises:  
a pair of opposing, rigid longitudinal walls; and

a pair of opposing, collapsable side walls, each of said side walls linking an end of one of said longitudinal walls to an end of the other of said longitudinal walls, said side walls adapted to collapse to allow a reduction in a distance between said longitudinal walls.

18. (Original) The container system according to claim 17, wherein said inner frame further comprises:

a rigid bottom pivotably engaged to one of said pair of opposing rigid walls, said rigid bottom adapted to selectively pivot between a first open position and a second collapsed position.

19. (Original) The container system according to claim 17, wherein said inner frame further comprises a fastener to secure said side walls in a collapsed position.

20. (Withdrawn) A method of transporting hazardous material, comprising:

providing a container system according to claim 6; and  
inserting said inner frame into said outer shell; and  
positioning hazardous material into said outer shell in an assembled configuration.

21. (Withdrawn) The method according to claim 20, wherein said hazardous material includes an organ.

22. (Withdrawn) The method according to claim 20, further comprising:

removing said hazardous material from said outer shell;  
removing said inner frame from said outer shell;  
collapsing said inner frame; and  
collapsing said outer shell.

23. (Withdrawn) The method according to claim 20, wherein said inserting said inner frame into said outer shell satisfies IATA 602 requirements for an outer packaging.

24. (Withdrawn) The method according to claim 20, wherein said soft-sided outer shell of said container includes vent holes.
25. (Previously Presented) The container system of claim 6, wherein said outer shell is capable of withstanding an internal pressure which produces a pressure differential of not less than 95kPa (0.95 bar, 13.8lb/in<sup>2</sup>) in the range or -40°C to +55°C (-40°F to 130°F).

**APPENDIX B: EVIDENCE**

1. Boyd-Moss *et al.*, U.S. Patent No. 6,631,801
2. Kalal, U.S. Patent Publication No. 2003/0106895
3. McHutchison, WIPO Publication No. WO 02/18210 A1
4. Redzisz *et al.*, U.S. Patent Publication No. 2003/0136702
5. Reichert, U.S. Patent No. 4,865,899
6. Tattam, U.S. Patent No. 6,609,628
7. Travis, U.S. Patent No. 4,585,159
8. Zeddies, U.S. Patent No. 6,336,342
9. *In re Clay*, 966 F.2d 656, 23 USPQ2d 1058 (Fed. Cir. 1992)
10. *In re Deminski*, 796 F.2d 436, 230 USPQ 313 (Fed. Cir. 1986)
11. *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992)
12. *In re Kotzab*, 217 F.3d 1365, 55 USPQ2d 1313 (Fed. Cir. 2000)
13. *In re Lee*, 277 F.3d 1338, 61 USPQ2d 1430 (Fed. Cir. 2002)
14. *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992)
15. *In re Rouffet*, 149 F.3d 1350, 47 USPQ2d 1453 (Fed. Cir. 1998)
16. Wolfram Mathworld, <http://mathworld.wolfram.com/Cuboid.html>

## (12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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PCT

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(74) Agent: WATERMARK PATENT & TRADEMARK ATTORNEYS; Level 21, Allendale Square, 77 St Georges Terrace, Perth, W.A. 6000 (AU).

(21) International Application Number: **PCT/AU01/01077**

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EB, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

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(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(25) Filing Language: English

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PQ 9738 28 August 2000 (28.08.2000) AU

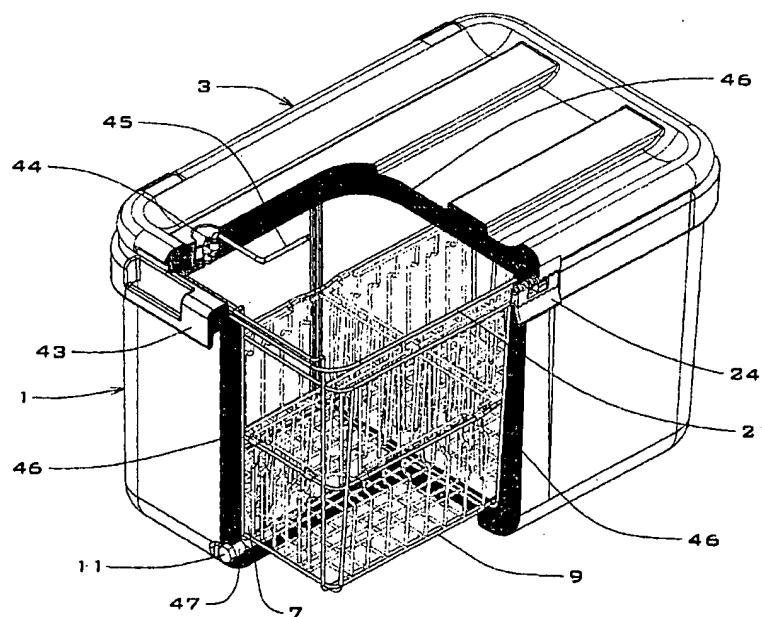
[Continued on next page]

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(75) Inventor/Applicant (*for US only*): **MCHUTCHISON, Roy [AU/AU]; 76 Douglas Ave., South Perth, W.A. 6151 (AU).**

(54) Title: MEDICAL TRANSPORT CONTAINER



**WO 02/18210 A1**

(57) Abstract: A medical transport container (1) for transporting donor organs, the container having an interior storage volume (7) which can be hermetically sealed, wherein the container includes a valve means (15, 17) for allowing air to be extracted from the storage volume such that a sub-atmospheric pressure can be maintained therein.

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**WO 02/18210 A1**

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

WO 02/18210

PCT/AU01/01077

1

### MEDICAL TRANSPORT CONTAINER

The present invention is generally directed at transport containers, and in particular to medical transport containers used in the transport of donor organs. Although the container according to the present invention will be described with respect to medical applications, it is to be appreciated that the container is also applicable for recreational, domestic and other applications.

Organs such as kidneys and livers deteriorate rapidly once the blood supply is cut to these organs. This deterioration process can be slowed by cooling the organ. Therefore, where an organ is removed from a donor, and it is not possible to immediately transplant that organ into a recipient patient because that patient is at a different location to the donor, then the organ needs to be transported while in a cooled state. In the case of kidneys, it is possible to conserve them for 24 to 48 hours by infusing a cold solution into the blood vessels and storing the kidney at about 4 degrees Celcius in a refrigerator or surrounded by ice in a vacuum flask. Such a kidney can also be transported within a thermally insulated container over long distances to the patient.

The container typically used to transport kidneys and other organs is made from thermally insulating material such as polystyrene to maintain the organ cool for as long as possible while being transported.

It has however been found that the organ can be conserved for a longer period if the organ is stored within a sub atmospheric pressure environment.

It is therefore an object of the present invention to provide an improved medical transport container for the transport of donor organs.

With this in mind, the present invention provides a medical transport container for transporting donor organs, the container having an interior storage volume which can be hermetically sealed, wherein the container includes a valve means for allowing air to be extracted from the storage volume such that a sub-atmospheric pressure can be maintained therein.

The valve means can be connected to a vacuum pump to extract air from the storage volume such that the pressure within the storage volume is below atmospheric. Therefore, an organ stored within the transport container can be subjected to a sub-atmospheric pressure therein.

WO 02/18210

PCT/AU01/01077

2

The container may include a container body having a lid, with a hermetic seal being provided between the container body and the lid. At least the container body may be thermally insulated. The lid may also thermally insulated.

To this end, at least the container body may be formed as an outer plastic shell

5 having inner and outer walls. The shell may be filled with a thermally insulating material. The outer shell may for example be produced from high density polyethylene in a rotor mould production process and subsequently injected with a thermally insulating material such as polystyrene foam. The lid may also be made with the same manufacturing process using the same material. The use of

10 other materials is however also envisaged.

The valve means may include a connection means for connecting to a vacuum pump and a valve arrangement may be located within a wall of the container. The connection means may include a suction line or spigot for connecting the valve arrangement to the vacuum pump, and the valve

15 arrangement may be in the form of a check valve for allowing air to pass out of the storage volume while preventing the ingress of air therein. The valve arrangement may further include means to allow air to bleed back into the storage volume following evacuation thereof, to facilitate subsequent opening of the lid.

A seal means may be provided between the container body and the lid to

20 allow for the hermetic sealing of the container. In an example embodiment, the container body may have an access opening surrounded by a peripheral internal shoulder. The lid is locatable over the access opening and may have an external shoulder adapted to cooperate with the internal shoulder of the access opening when located thereon. An "o-ring" type seal may be provided between

25 the internal and external shoulders to provide the necessary hermetic seal. Seals of alternative configurations are also envisaged.

The lid may be supported on the container body by a hinge arrangement along one side thereof. A coupling arrangement may be provided on the opposing side of the lid to couple the lid to the container body when closed over

30 the access opening. The coupling arrangement may include means for urging the lid against the container body to ensure that there is little to no leakage of air between the lid and the container body. The coupling arrangement may therefore include a catch including a body member hinged to either the lid or the container

WO 02/18210

PCT/AU01/01077

3

body. The cooperating container body or lid may include a lug extending therefrom, and the body member of the catch may include an opening for accommodating the lug therein when the lid is closed over the access opening. The catch may further include an abutment member connected by a middle hinge 5 to the body member. The abutment member may include at least one cam, which may extend into the opening of the body member as the abutment member is pivoted about the middle hinge. The cam may abut the lug when located within the opening of the body member. Pivotal movement of the abutment member will urge the cam against the lug such that a pulling force is applied to the body 10 member, and therefore the lid against the container body. The coupling arrangement may be flush with the outer surface of the container once the abutment member is pivoted to its final position.

The medical transport container according to the present invention allows the transport of donor organs under sub-atmospheric pressures. This enables the 15 organ to be stored in the container for a longer period than conventional thermally insulated containers.

It will be convenient to further describe the invention with respect to the accompanying drawings, which illustrate a preferred embodiment of a medical transport container according to the present invention. Other embodiments of the 20 invention are possible, and consequently, the particularity of the accompanying drawings is not to be understood as superseding the generality of the preceding description of the invention.

In the drawings:

Figure 1 is a perspective view of a medical transport container according to 25 the present invention;

Figure 2 is a cut-out perspective view of the container of Figure 1;

Figure 3 is a top view of the container of Figure 1;

Figure 3a is a cross-section view of the container taken along line A-A of Figure 3;

30 Figure 4 is another cutout view of the container of Figure 1 with the lid open;

WO 02/18210

PCT/AU01/01077

4

Figure 5 to 5b are respectively detailed perspective views of the coupling arrangement of the container of Figure 1 showing in sequence the operation of the coupling arrangement; and

Figure 6 to 6b are cross-sectional views of the coupling arrangement as 5 respectively shown in Figures 5 to 5b.

Referring initially to Figures 1 to 4, the medical transport container according to the present invention includes a container body 1, and a lid 3 hingedly supported on the container body 3 by a hinge 48 to cover an access opening 5 of that container body. The container body 1 has an internal storage 10 volume 7 within which is accommodated a wire basket 9. Alternatively, the storage volume 7 can be separated by a wall panel 9 into two separate sections. The container body 1 is provided with a drain plug 11 having a threaded section 47 for engaging a cooperating bore in the container body 1. This drain plug 11 can be removed to allow the drainage of fluid from within the container.

15 Provided within the lid is a cavity 13 within which is located a valve arrangement 15. This valve arrangement 15 is provided with a suction line 45 to which a vacuum pump can be attached. The valve arrangement 15 is in the form of a flow control check valve which allows the extraction of air from within the internal volume 7 through an aperture 50 provided in the underside of the lid 3 20 while preventing the flow of air through the valve 15 from that internal volume. This check valve 15 is dual action and includes a needle valve 44 that can be opened to allow air back into the internal volume 7 thereby returning the pressure therein to atmospheric facilitating the opening of the container.

The container further includes an O-ring type seal 21 located between the 25 lid 3 and container body 1 to thereby provide a hermetic seal for the container. A coupling arrangement 24 retains the lid 3 in a closed position over the access opening 5 of the container body 1.

Both the container body 1 and lid 3 are formed with an outer shell made of plastic such as high density polyethylene. This outer shell can be made in a rotor 30 mould production process. The shell can then be injected with a polystyrene foam to provide a central thermally insulating core for both the container body 1 and the lid 3.

WO 02/18210

PCT/AU01/01077

## 5

Figure 3a and 4 shows in more detail the cooperation of the container body 1 and lid 3. The container body 1 includes an inner shoulder 25 surrounding the access opening 5 thereof. The lid is provided with an outer shoulder 27 which cooperates with and rests within the confines of the inner shoulder 25 of the 5 container body 1 when the lid is located over and closes the access opening 5. The O-ring type seal 21 is located within a channel 29 provided at the base of the inner shoulder 25 of the container body 1. This allows the seal 21 to provide a hermetic seal between the container body 1 and lid 3 when the container is closed.

10 Figures 5 to 6b show in more detail the coupling arrangement 24 which includes a catch 32 having a body member 33 hingedly mounted on the lid 3 via a hinge joint 52. The body member 33 has an opening 35 passing therethrough. A lug 31 extends from the container body 1. This lug 31 is accommodated within the opening 35 of the coupling arrangement 24 when the lid 3 is closed over the 15 access opening 5 of the container body 1. The coupling arrangement 24 further includes an abutment member 34 hingedly connected to the body member 33 via hinge joint 51. The abutment member 34 includes a series of cams 37 which can extend into the area of the opening 35 of the body member 33 as it is rotated about its hinge joint 51. Figure 6 shows in more detail the position of the cams 37 20 as the catch 32 approaches its closed position. The cams 37 are displaced into the opening as to abut and press against the lug 31 of the container body 1 thereby providing a pulling force on the body member 33 of the catch 32 and thereby pulling the lid 3 against the container body 1. This also results in pressure being applied on the seal 21. Figure 1 shows that the catch 32 is flush 25 with the outer surface of the container body 1 when fully closed.

The lid 3 is formed with a series of ribs 39. The bottom of the container body 1 is provided with a series of channels 41. This allows the containers to be securely stacked one on top of each other, with the ribs 39 of the lid 3 engaging the channels 41 of the next container. Also provided at one end of the container 30 body 1 is a coupling member 43. At the opposing end of the container body is a coupling hook members 55 (see Figure 3) that can engage the coupling member. Therefore two adjacent containers abutting end to end can be held together by

WO 02/18210

PCT/AU01/01077

6

coupling the coupling hook members 55 to the coupling member 43 of the adjacent container.

The medical transport container according to the present invention provides a thermally insulated enclosure for a donor organ being transported.

- 5 Furthermore, the container can be hermetically sealed and air extracted from the inner volume 7 such that the donor organ is stored in sub atmospheric pressure conditions. This allows the organ to be conserved for a longer period within the container.

- 10 Modifications and variations as would be deemed obvious to the person skilled in the art are included within the ambit of the present invention as detailed in the appended claims.

WO 02/18210

PCT/AU01/01077

7

Claims:

1. A medical transport container for transporting donor organs, the container having an interior storage volume which can be hermetically sealed, wherein the container includes a valve means for allowing air to be extracted from the storage volume such that a sub-atmospheric pressure can be maintained therein.
2. A medical transport container according to claim 1, wherein the valve means includes a connection means for connecting to a vacuum pump, and a valve arrangement provided within a wall of the container for allowing air to pass into the storage volume while preventing the exit of air therefrom.
3. A medical transport container according to claim 2, wherein the connection means includes a suction line for connecting to the vacuum pump, and the valve arrangement is in the form of a dual action flow control check valve.
4. A medical transport container according to any one of the preceding claims, wherein the container includes a container body and a lid for covering an access opening of the container body, with a hermetic seal being provided between the container body and the lid.
5. A medical transport container according to claim 4, wherein at least the container body is thermally insulated.
6. A medical transport container according to claim 5, wherein the lid is also thermally insulated.
7. A medical transport container according to claim 5 or 6, wherein at least the container body is formed from a plastic outer shell filled with a thermally insulating material.
8. A medical transport container according to any one of claims 4 to 6, wherein the valve means is located in the lid.

WO 02/18210

PCT/AU01/01077

8

9. A medical transport container according to any one of claims 4 to 6, wherein the lid is supported on the container body by a hinge arrangement along one side thereof, with a coupling arrangement being provided on the opposing side thereof, wherein the coupling arrangement urges the lid against the container body when closed over the container body to thereby apply a compression force on the seal therebetween.
10. A medical transport container according to claim 9, wherein the coupling arrangement includes a lug located on one of the container body or lid, and a catch located on the cooperating lid or container body, the catch including a body member hingedly connected thereto, the body member having an opening for accommodating the lug when the lid is closed over the container body, the catch further including an abutment member hingedly connected to the body member and having at least one cam which can extend into the body member opening as the abutment member is pivoted about its' hinge connection.
11. A medical transport container according to claim 9 or 10, wherein the coupling arrangement lies flush against the outer surface of the container body when in its closed position.

WO 02/18210

PCT/AU01/01077

1/6

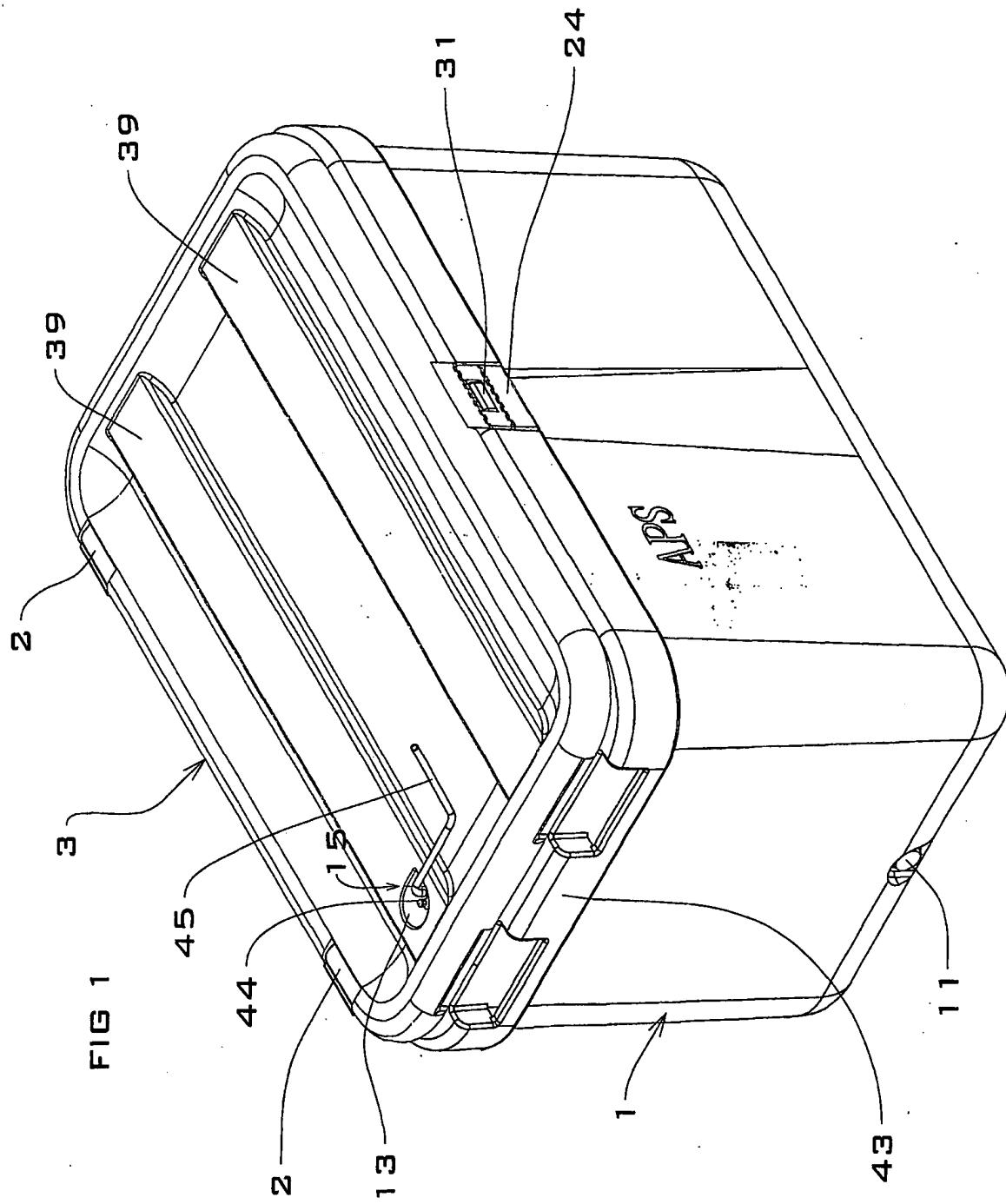
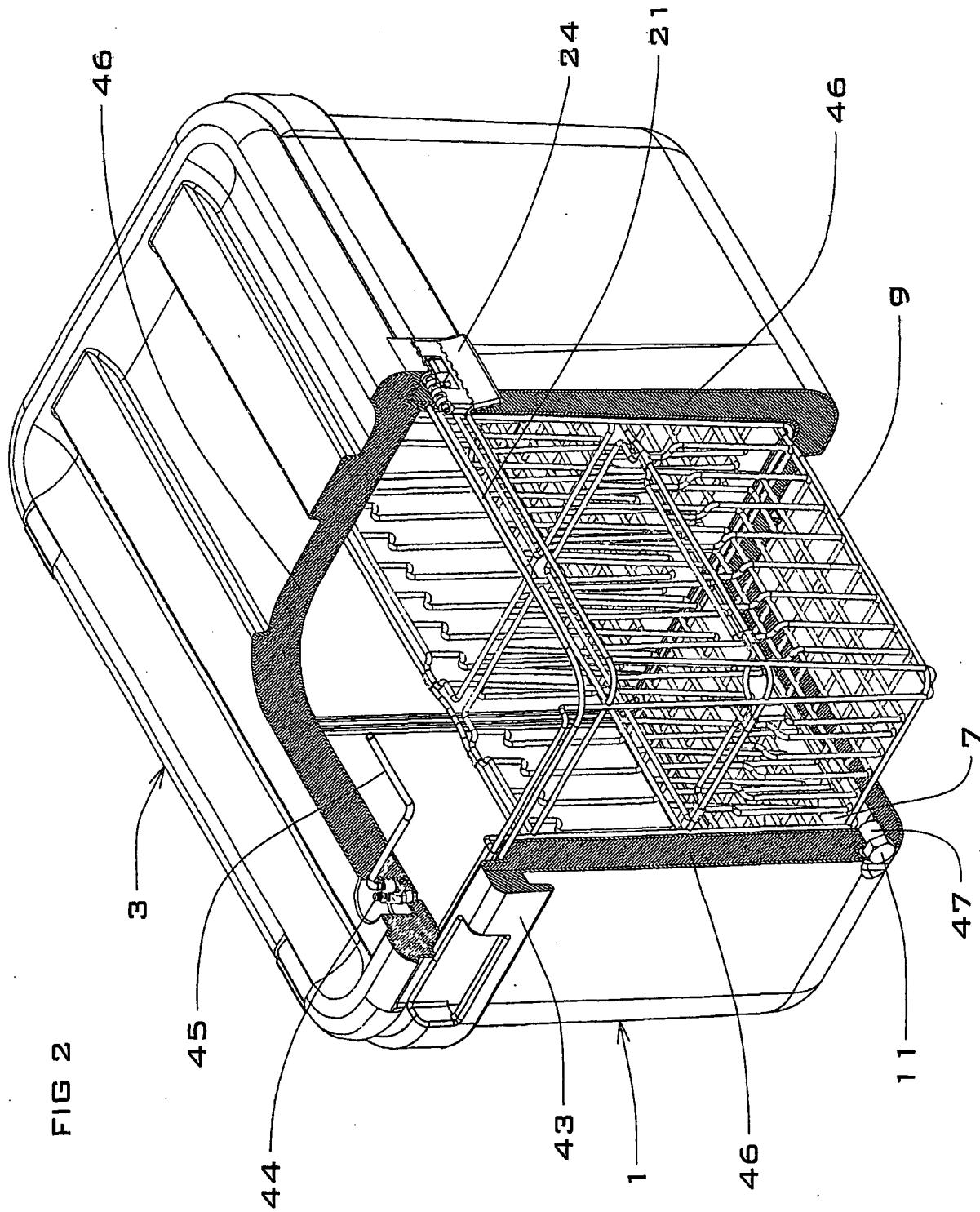


FIG 1

WO 02/18210

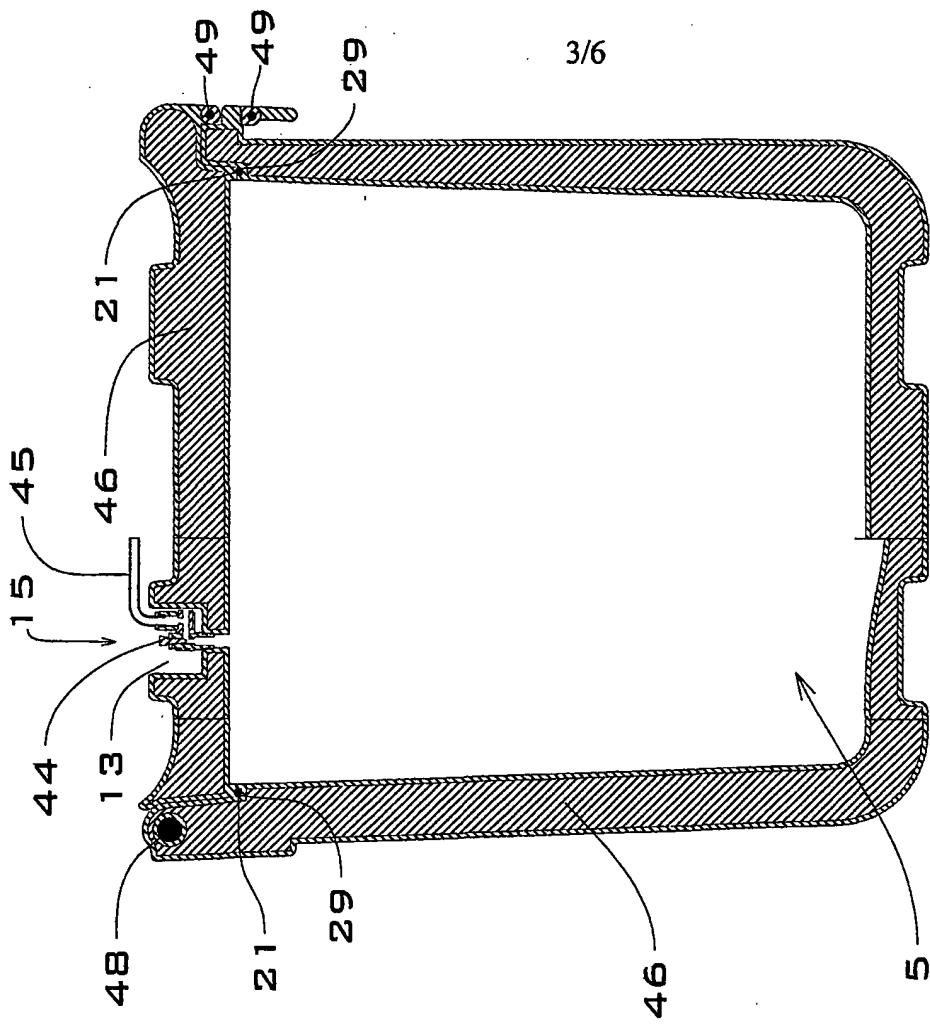
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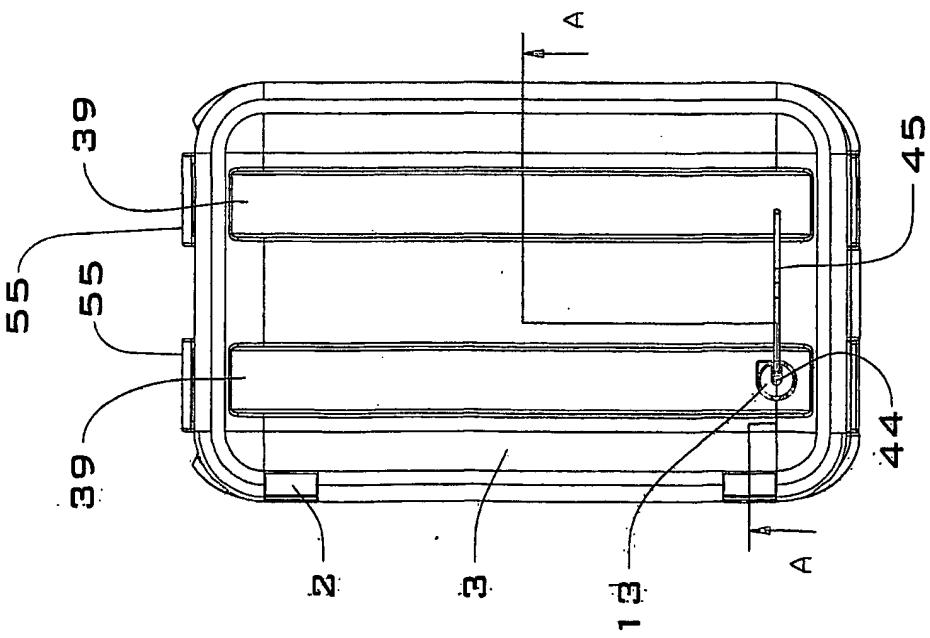


WO 02/18210

PCT/AU01/01077



**SECTION A - A**

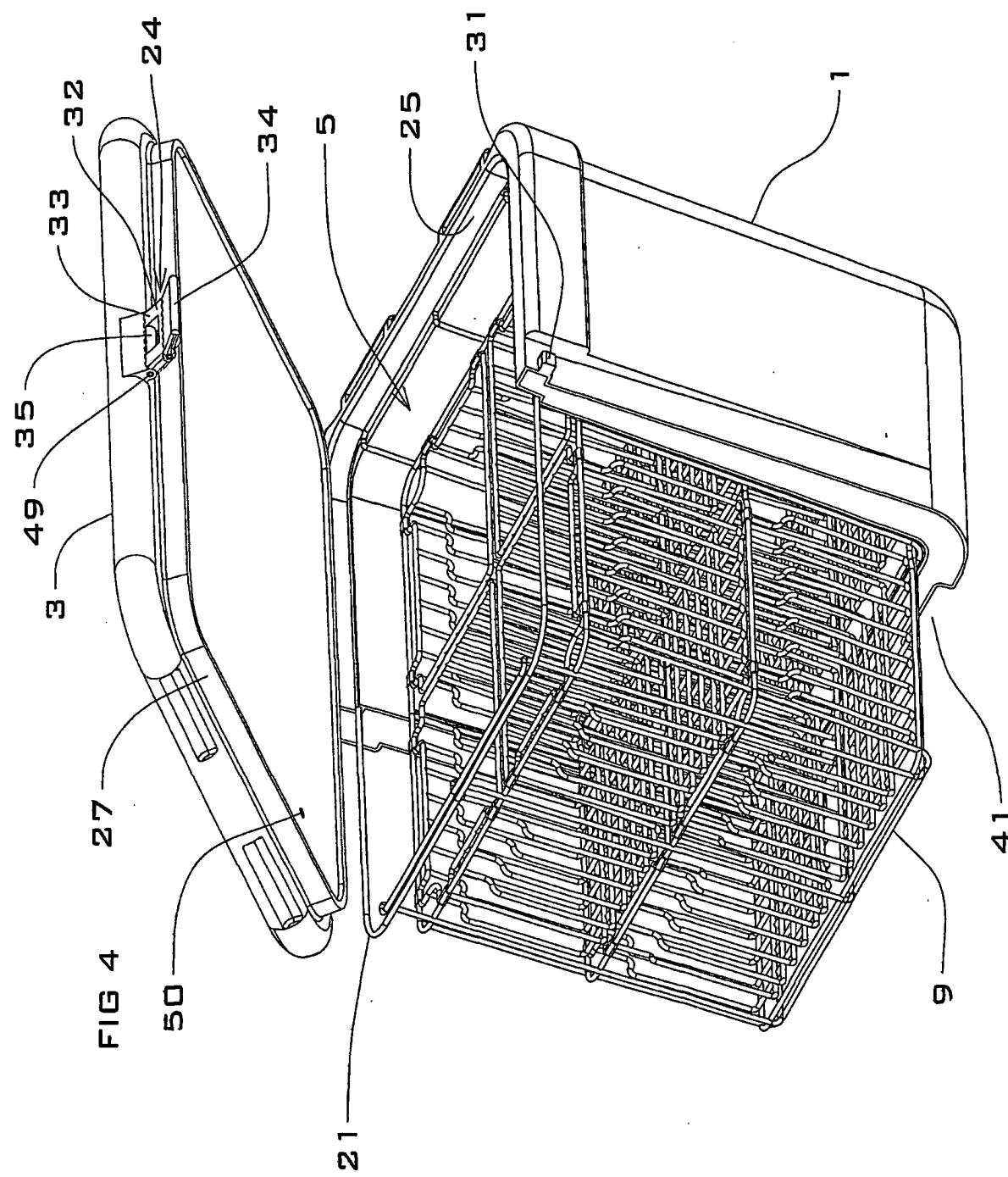


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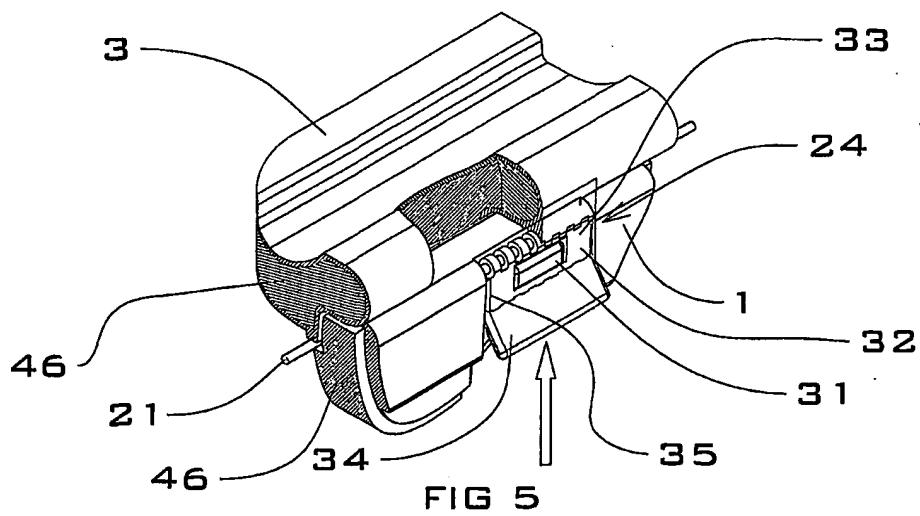
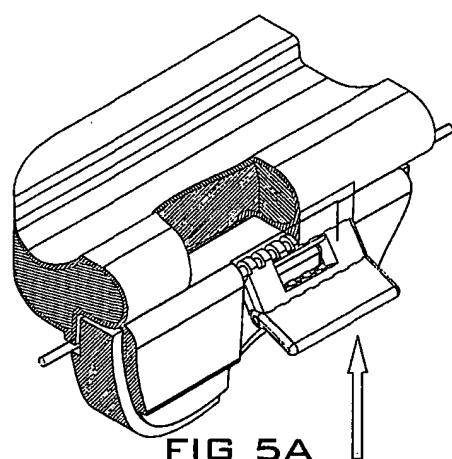
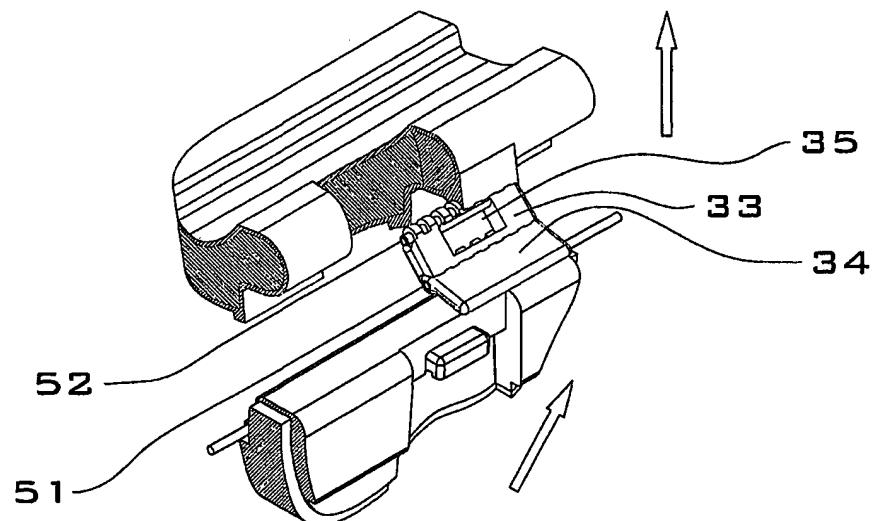
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WO 02/18210

PCT/AU01/01077

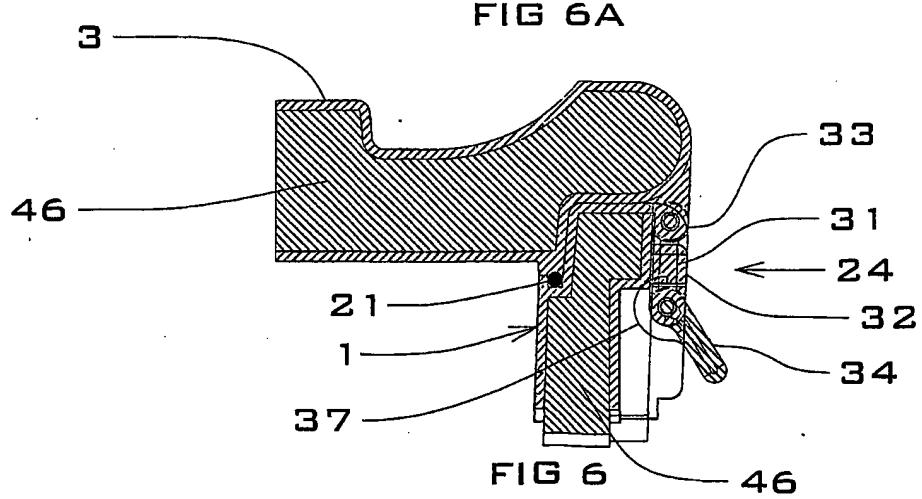
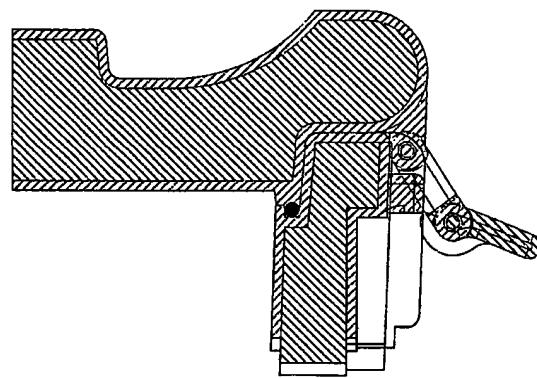
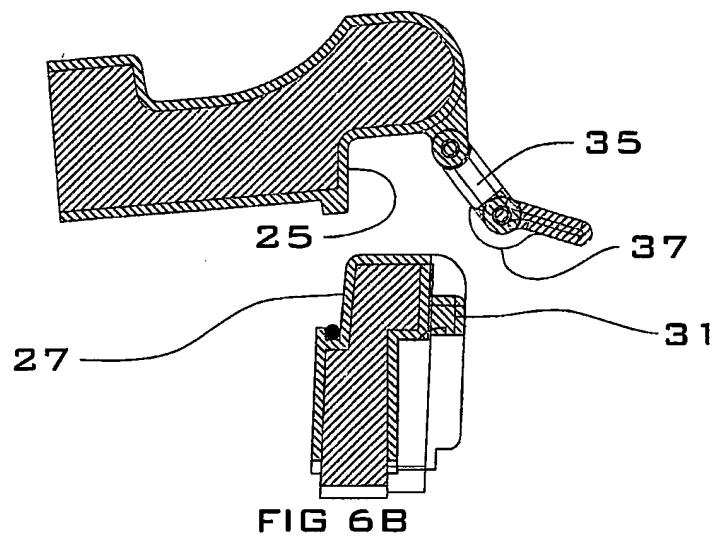
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WO 02/18210

PCT/AU01/01077

6/6



INTERNATIONAL SEARCH REPORT		International application No. PCT/AU01/01077
<b>A. CLASSIFICATION OF SUBJECT MATTER</b>		
Int. Cl. <sup>7</sup> : B65B 31/04, B65D 81/20, 85/50, A61J 1/00, F25D 3/08		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols) SEE ELECTRONIC DATA BASE BELOW		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) DWPI & IPC - A01N 1/02, A61B 19/-, A61J 1/-, B65B 31/04, B65D 81/20, 85/50, F25D 3/08 & Keywords (organ, hermetic, vacuum, transport, valve, pump) and similar terms & USPTO & similar keywords		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5960708 A (DETEMPLE et al.) 5 October 1999 See particularly abstract and figs 1 & 2	1-11
X	EP 287555 B (MAYER et al) 19 October 1988 See whole document, particularly figs and English abstract	1-5,8
X	US 5339959 A (CORNWELL) 23 August 1994 See whole document, figs 2 & 6	1
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C <input checked="" type="checkbox"/> See patent family annex		
<p>* Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&amp;" document member of the same patent family</p>		
Date of the actual completion of the international search <u>21 September 2001</u>	Date of mailing of the international search report <u>21 SEPTEMBER 2001</u>	
Name and mailing address of the ISA/AU  AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized officer  <b>STEPHEN CLARK</b> Telephone No : (02) 6283 2781	

INTERNATIONAL SEARCH REPORT		International application No. PCT/AU01/01077
C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	Derwent Abstract Accession No. 1999-419668/36, Class Q34, CN 1215689 A (WANG) 5 May 1999	1

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

International application No.  
**PCT/AU01/01077**

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member	
US	5960708	EP	1087672
EP	287555	AT	957/87
US	5339959	JP	7265365
CN	1215689		NONE
END OF ANNEX			

**C**

United States Court of Appeals,  
 Federal Circuit.  
 In re Carl D. CLAY.  
**No. 91-1402.**

June 10, 1992.

Appeal was taken from decision of Board of Patent Appeals and Interferences affirming rejection of claims of patents for process for storing refined liquid hydrocarbon product in storage tank having dead volume between tank bottom and outlet port as being unpatentable because of obviousness. The Court of Appeals, Lourie, Circuit Judge, held that patent was not rendered obvious by prior invention using gel to channel flow of petroleum in naturally occurring underground reservoirs.

Reversed.

#### West Headnotes

##### **[1] Patents** **314(5)**

###### 291k314(5) Most Cited Cases

Although conclusion that invention would have been obvious from combined teachings of prior art is one of law, such determinations are made against background to several factual inquiries, one of which is scope and content of prior art.

##### **[2] Patents** **314(5)**

###### 291k314(5) Most Cited Cases

##### **[2] Patents** **324.55(2)**

###### 291k324.55(2) Most Cited Cases

Whether referenced prior art is "analogous" is a fact question and, therefore, Court of Appeals for the Federal Circuit reviews decision of Patent and Trademark Office Board of Patent Appeals and Interferences on that point under clearly erroneous standard. 35 U.S.C.A. § 103.

##### **[3] Patents** **16(2)**

###### 291k16(2) Most Cited Cases

Criteria to be considered in determining whether prior art is analogous under statute rendering a patent invalid based on obviousness are whether art is from same field of endeavor, regardless of problem addressed, and if reference is not within field of inventor's endeavor, whether reference still is

reasonably pertinent to particular problem with which inventor is involved. 35 U.S.C.A. § 103.

##### **[4] Patents** **16(2)**

###### 291k16(2) Most Cited Cases

Patent for process of using gel in storing refined liquid hydrocarbon products in storage tanks was not rendered obvious by prior invention using gel to channel flow of petroleum in naturally occurring underground reservoir; prior invention was not within same field of endeavor as patentee's process and was not reasonably pertinent to problem patentee attempted to solve. 35 U.S.C.A. § 103.

##### **[5] Patents** **16(2)**

###### 291k16(2) Most Cited Cases

Prior art reference is reasonably pertinent, for purposes of determining whether prior art is analogous so as to render patent invalid for obviousness, is, even though it may be from different field from that of inventor's endeavor, it is one which, because of matter with which it deals, logically would have commended itself to inventor's intent in considering his problem. 35 U.S.C.A. § 103.

##### **Patents** **328(2)**

###### 291k328(2) Most Cited Cases

4,664,294, 4,683,949. Prior art.

\*657 Jack E. Ebel, Marathon Oil Co., Littleton, Colo., argued, for appellant. With him on the brief, was Paul T. Meiklejohn, Seed & Berry, Seattle, Wash., of counsel.

Teddy S. Gron, Associate Sol., Office of Sol., Arlington, Va., argued, for appellee. With him on the brief, was Fred E. McKelvey, Sol. Of counsel was Richard E. Schafer.

Before PLAGER, LOURIE, and CLEVINGER, Circuit Judges.

LOURIE, Circuit Judge.

Carl D. Clay appeals the decision of the United States Patent and Trademark Office, Board of Patent Appeals and Interferences, Appeal No. 90- 2262, affirming the rejection of claims 1-11 and 13 as being unpatentable under 35 U.S.C. § 103. These are all the remaining claims in application Serial No. 245,083, filed April 28, 1987, entitled "Storage of a Refined Liquid Hydrocarbon Product." We reverse.

## BACKGROUND

Clay's invention, assigned to Marathon Oil Company, is a process for storing refined liquid hydrocarbon product in a storage tank having a dead volume between the tank bottom and its outlet port. The process involves preparing a gelation solution which gels after it is placed in the tank's dead volume; the gel can easily be removed by adding to the tank a gel-degrading agent such as hydrogen peroxide. Claims 1, 8, and 11 are illustrative of the claims on appeal:

1. A process for storing a refined liquid hydrocarbon product in a storage tank having a dead volume between the bottom of said tank and an outlet port in said tank, said process comprising: preparing a gelation solution comprising an aqueous liquid solvent, an acrylamide polymer and a crosslinking agent containing a polyvalent metal cation selected from the group consisting of aluminum, chromium and mixtures thereof, said gelation solution capable of forming a rigid crosslinked polymer gel which is \*658 substantially insoluble and inert in said refined liquid hydrocarbon product; placing said solution in said dead volume; gelling said solution substantially to completion in said dead volume to produce said rigid gel which substantially fills said dead volume; and storing said refined liquid hydrocarbon product in said storage tank in contact with said gel without substantially contaminating said product with said gel and without substantially degrading said gel.
8. The process of claim 1 further comprising removing said rigid gel from said dead volume by contacting said gel with a chemical agent which substantially degrades said gel to a flowing solution.

11. The process of claim 1 wherein said gelation solution further comprises an aqueous liquid contaminant present in said dead volume which dissolves in said solution when said solution is placed in said dead volume.

Two prior art references were applied against the claims on appeal. They were U.S. Patent 4,664,294 (Hetherington), which discloses an apparatus for displacing dead space liquid using impervious bladders, or large bags, formed with flexible membranes; and U.S. Patent 4,683,949 (Sydansk), also assigned to Clay's assignee, Marathon Oil Company, which discloses a process for reducing the permeability of hydrocarbon-bearing formations and thus improving oil production, using a gel similar to that in Clay's invention.

The Board agreed with the examiner that, although neither reference alone describes Clay's invention, Hetherington and Sydansk combined support a conclusion of obviousness. It held that one skilled in the art would glean from Hetherington that Clay's invention "was appreciated in the prior art and solutions to that problem generally involved filling the dead space with *something*." Opinion at 3 (emphasis in original).

The Board also held that Sydansk would have provided one skilled in the art with information that a gelation system would have been impervious to hydrocarbons once the system gelled. The Board combined the references, finding that the "cavities" filled by Sydansk are sufficiently similar to the "volume or void space" being filled by Hetherington for one of ordinary skill to have recognized the applicability of the gel to Hetherington.

## DISCUSSION

[1] The issue presented in this appeal is whether the Board's conclusion was correct that Clay's invention would have been obvious from the combined teachings of Hetherington and Sydansk. Although this conclusion is one of law, such determinations are made against a background of several factual inquiries, one of which is the scope and content of the prior art. *Graham v. John Deere Co.*, 383 U.S. 1, 17, 86 S.Ct. 684, 693-94, 15 L.Ed.2d 545, 148 USPQ 459, 467 (1966).

A prerequisite to making this finding is determining what is "prior art," in order to consider whether "the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art." 35 U.S.C. § 103. Although § 103 does not, by its terms, define the "art to which [the] subject matter [sought to be patented] pertains," this determination is frequently couched in terms of whether the art is analogous or not, i.e., whether the art is "too remote to be treated as prior art." *In re Sovish*, 769 F.2d 738, 741, 226 USPQ 771, 773 (Fed.Cir.1985).

[2] Clay argues that the claims at issue were improperly rejected over Hetherington and Sydansk, because Sydansk is nonanalogous art. Whether a reference in the prior art is "analogous" is a fact question. *Panduit Corp. v. Dennison Mfg.*, 810 F.2d 1561, 1568 n. 9, 1 USPQ2d 1593, 1597 n. 9 (Fed.Cir.), cert. denied, 481 U.S. 1052, 107 S.Ct.

2187, 95 L.Ed.2d 843 (1987). Thus, we review the Board's decision on this point under the clearly erroneous standard.

[3] Two criteria have evolved for determining whether prior art is analogous: (1) \*659 whether the art is from the same field of endeavor, regardless of the problem addressed, and (2) if the reference is not within the field of the inventor's endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved. *In re Deminski*, 796 F.2d 436, 442, 230 USPQ 313, 315 (Fed.Cir.1986); *In re Wood*, 599 F.2d 1032, 1036, 202 USPQ 171, 174 (CCPA 1979).

[4] The Board found Sydansk to be within the field of Clay's endeavor because, as the Examiner stated, "one of ordinary skill in the art would certainly glean from [Sydansk] that the rigid gel as taught therein would have a number of applications within the manipulation of the storage and processing of hydrocarbon liquids ... [and that] the gel as taught in Sydansk would be expected to function in a similar manner as the bladders in the Hetherington patent." These findings are clearly erroneous.

The PTO argues that Sydansk and Clay's inventions are part of a common endeavor--"maximizing withdrawal of petroleum stored in petroleum reservoirs." However, Sydansk cannot be considered to be within Clay's field of endeavor merely because both relate to the petroleum industry. Sydansk teaches the use of a gel in unconfined and irregular volumes within generally underground natural oil-bearing formations to channel flow in a desired direction; Clay teaches the introduction of gel to the confined dead volume of a man-made storage tank. The Sydansk process operates in extreme conditions, with petroleum formation temperatures as high as 115° C and at significant well bore pressures; Clay's process apparently operates at ambient temperature and atmospheric pressure. Clay's field of endeavor is the *storage* of refined liquid hydrocarbons. The field of endeavor of Sydansk's invention, on the other hand, is the *extraction* of crude petroleum. The Board clearly erred in considering Sydansk to be within the same field of endeavor as Clay's.

[5] Even though the art disclosed in Sydansk is not within Clay's field of endeavor, the reference may still properly be combined with Hetherington if it is reasonably pertinent to the problem Clay attempts to solve. *In re Wood*, 599 F.2d at 1036, 202 USPQ at 174. A reference is reasonably pertinent if, even though it may be in a different field from that of the

inventor's endeavor, it is one which, because of the matter with which it deals, logically would have commended itself to an inventor's attention in considering his problem. Thus, the purposes of both the invention and the prior art are important in determining whether the reference is reasonably pertinent to the problem the invention attempts to solve. If a reference disclosure has the same purpose as the claimed invention, the reference relates to the same problem, and that fact supports use of that reference in an obviousness rejection. An inventor may well have been motivated to consider the reference when making his invention. If it is directed to a different purpose, the inventor would accordingly have had less motivation or occasion to consider it.

Sydansk's gel treatment of underground formations functions to fill anomalies [FN1] so as to improve flow profiles and sweep efficiencies of injection and production fluids through a formation, while Clay's gel functions to displace liquid product from the dead volume of a storage tank. Sydansk is concerned with plugging formation anomalies so that fluid is subsequently diverted by the gel into the formation matrix, thereby forcing bypassed oil contained in the matrix toward a production well. Sydansk is faced with the problem of recovering oil from rock, *i.e.*, from a matrix which is porous, permeable sedimentary rock of a subterranean formation where water has channeled through formation anomalies and bypassed oil present in the matrix. Such a problem is not reasonably pertinent to the particular problem with which Clay was involved--preventing loss of stored \*660 product to tank dead volume while preventing contamination of such product. Moreover, the subterranean formation of Sydansk is not structurally similar to, does not operate under the same temperature and pressure as, and does not function like Clay's storage tanks. See *In re Ellis*, 476 F.2d 1370, 1372, 177 USPQ 526, 527 (CCPA 1973) ("the similarities and differences in structure and function of the invention disclosed in the references ... carry far greater weight [in determining analogy]").

[FN1]. Sydansk refers to an anomaly, one of two general region types in an oil-bearing geological formation, as "a volume or void space [*e.g.*, 'streaks, fractures, fracture networks, vugs, solution channels, caverns, washouts, cavities, etc.'] in the formation having very high permeability relative to the matrix [the other region type, consisting of homogeneous porous rock]."

A person having ordinary skill in the art would not reasonably have expected to solve the problem of dead volume in tanks for storing refined petroleum by considering a reference dealing with plugging underground formation anomalies. The Board's finding to the contrary is clearly erroneous. Since Sydansk is non-analogous art, the rejection over Hetherington in view of Sydansk cannot be sustained.

CONCLUSION

For the foregoing reasons, the decision of the Board is

REVERSED.

966 F.2d 656, 23 U.S.P.Q.2d 1058

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**C**

United States Court of Appeals,  
 Federal Circuit.  
 In re Richard M. DEMINSKI.  
 Appeal No. 85-2267.

July 8, 1986.

Inventor appealed decision of Patent and Trademark Office Board of Patent Appeals and Interferences which affirmed examiner's final rejection of claims in inventor's utility patent application relating to high pressure gas transmission compressor. The Court of Appeals, Edward S. Smith, Circuit Judge, held that: (1) earlier double-acting piston pumps were properly considered as prior art within field of inventor's endeavor for purpose of patent application insofar as inventor sought to patent horizontally reciprocating, double-acting piston-type gas compressor, but (2) there was nothing in prior art references to suggest desirability, and thus obviousness, of designing valve assembly so that it could be removed as unit through opening at top of valve chamber.

Affirmed in part, and reversed in part.

#### West Headnotes

##### [1] Patents 16.31

###### 291k16.31 Most Cited Cases

Earlier double-acting piston pumps were properly considered as prior art within field of inventor's endeavor for purpose of patent application, with result that certain claims were unpatentable as obvious, insofar as inventor sought to patent horizontally reciprocating, double-acting piston-type gas compressor with essentially same function and structure as prior pumps through moving fluids by means of double-acting piston, cylinder and valves. 35 U.S.C.A. § 103.

##### [2] Patents 16.31

###### 291k16.31 Most Cited Cases

Earlier double-acting piston pumps were not prior art, providing inventor with motivation to design valve assembly vertically removable as unit, through designing compressor with four vertically oriented valve chambers containing valve assembly removable through opening at top of valve chamber, with result that claims relating to valve assembly removable as unit were not obvious, as only prior pump teaching

such removability was typically small, and required valve pieces to be removed item-by-item through turning pump upside down, by using tool, or by hand. 35 U.S.C.A. § 103.

#### Patents 328(2)

##### 291k328(2) Most Cited Cases

1,226,693, 1,946,166, 1,976,464. Cited as prior art.

\*437 David E. Schmit, Frost & Jacobs, Cincinnati, Ohio, argued, for appellant. With him on brief, was Timothy J. O'Hearn, Cincinnati, Ohio.

John C. Martin, Associate Sol., Arlington, Va., argued, for appellee. With him on brief, were Joseph F. Nakamura, Solicitor, Washington, D.C., and Fred E. McKelvey, Deputy Sol., Woodbridge, Va.

Before BALDWIN, SMITH, and NEWMAN, Circuit Judges.

EDWARD S. SMITH, Circuit Judge.

This is an appeal by Richard M. Deminski (Deminski) from the February 25, 1985, decision of the Patent and Trademark Office Board of Patent Appeals and Interferences (board), in which the board affirmed the examiner's final rejection, under 35 U.S.C. § 103, of certain claims in Deminski's utility patent application, serial No. 177,863, relating to a high pressure gas transmission compressor. We affirm in part and reverse in part.

#### Issue

The issue is whether the board erred in affirming the examiner's rejection of claims 1-3, 6, 7, 17, 18, and 21 of the Deminski patent application, under 35 U.S.C. § 103, as unpatentable over the prior art. We affirm the rejection of claims 1-3, 6, and 7. We reverse the rejection of claims 17, 18, and 21.

#### Deminski's Invention

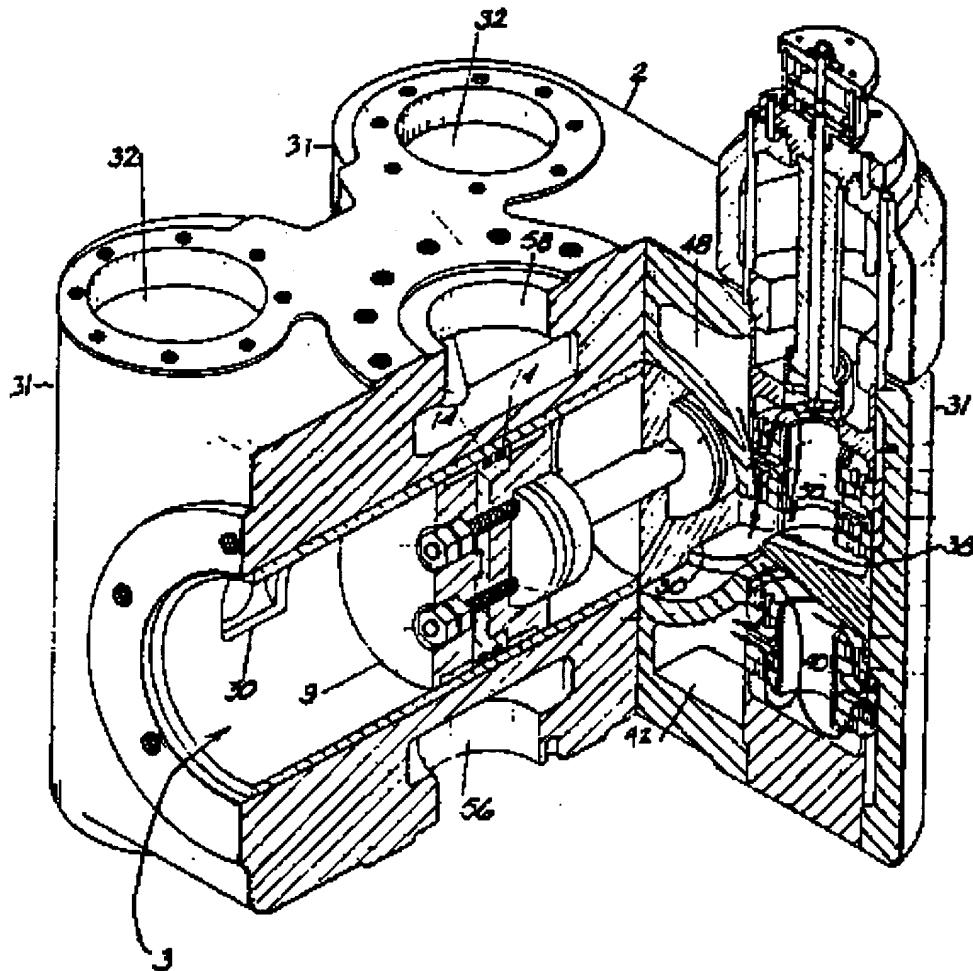
Deminski's invention "relates generally to double-acting high pressure gas transmission compressors," such as those used "for transmitting natural gas and other compressible fluids through pipe lines." More particularly, the invention is directed to a horizontally reciprocating, double-acting piston type gas compressor in which the valves can be removed easily for replacement.

The embodiment of Deminski's invention (Fig. 1)

includes a block-like compressor housing (2) with a horizontal cylinder (3) which extends longitudinally through the housing and a double-acting piston (9) carrying piston rings (14). There are four openings (30) in the cylinder, with passageways (38) to four vertically disposed cylindrical valve chambers (32), which chambers are located at the four corners of the

compressor housing (2). A suction valve (50), a discharge valve (40), and a baffle between the valves form a valve assembly which may be withdrawn as a unit from valve chamber (32).

\*438



*Claims on Appeal*

Claims 1, 3, 6, 7, 17, 18, and 21 were rejected under 35 U.S.C. § 103 as unpatentable over Pocock U.S. Patent No. 1,226,693 in view of British Patent No. 1,332,774 and Shallenberg U.S. Patent No. 1,976,464. Briefly, the examiner and the board stated that it would have been obvious in view of the British reference to add two more valve chambers to Pocock, and in view of Shallenberg to move the cylinder upwardly so that it is above the bottom of the valve chambers.

Claim 2 was rejected under 35 U.S.C. § 103 as unpatentable over Pocock in view of the British reference and Shallenberg, and further in view of Kovach which teaches the use of a piston ring in a

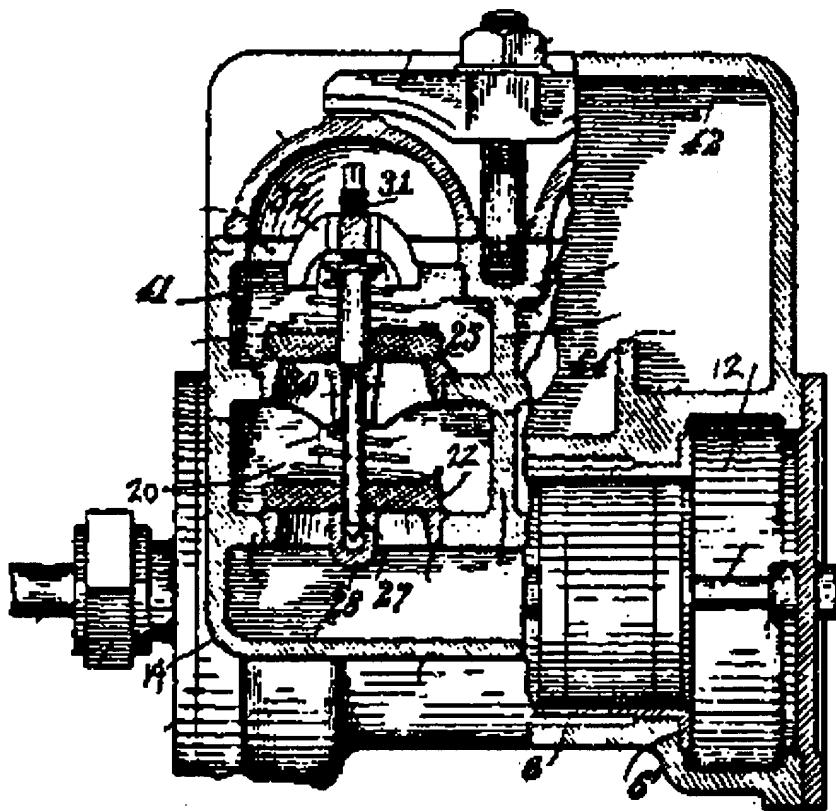
double-acting piston pump.

Prior Art Relied Upon by the Board  
*A. Pocock.*

Pocock's U.S. Patent No. 1,226,693 teaches a double-acting piston pump. The pump is typically small and is used to pump water out of underground mines.

\*439 A significant feature of Pocock is that the valve stem (27) (Figs. 2, 3) is easily removable because it is not rigidly connected to the valves or the valve seats. After the valve stem is removed, the valve pieces can be removed either by turning the pump upside down or by withdrawing the pieces one at a time with tools

or by hand.



**Fig. 2**  
**(Pocock -- Side View)**

\*440

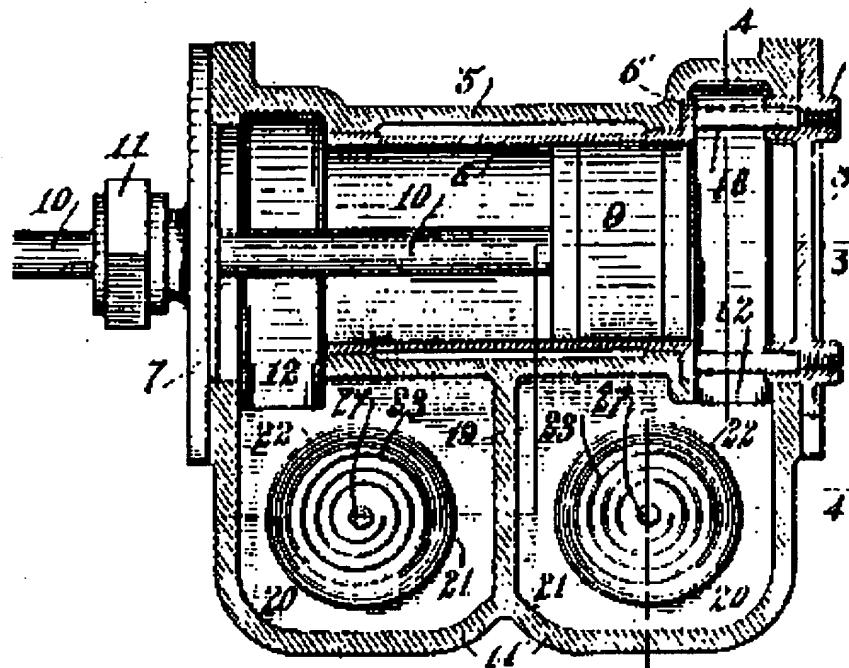


Fig. 3  
(Pocock -- Top View)

Pocock shows two valve housings (14) located along the same side of the pump cylinder. The valve housings are vertically oriented, so that the valves can be removed vertically through the top of the housing. The Pocock structure does not allow for removal of the valve assembly as a unit.

B. British Patent.

The British Patent No. 1,332,774 is directed to a double-acting piston compressor with a horizontal cylinder (2), such as a high capacity piston compressor for use with gas pipelines (Fig. 4). The British patent shows four horizontal valve chambers. Two of the valve chambers are located above the cylinder and two of the chambers are located below the cylinder. Each valve chamber is perpendicular to the cylinder.

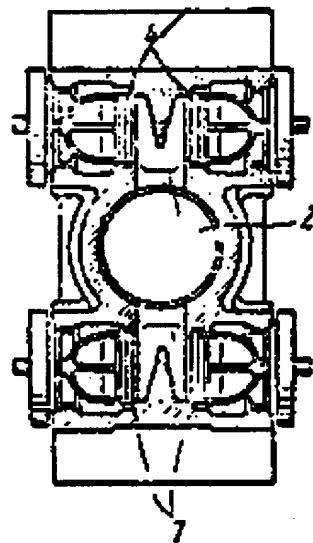


Fig. 4  
(British Patent) \*441 C. Shallenberg.

Shallenberg, U.S. Patent No. 1,976,464, teaches a double-acting piston pump with a particular valve construction. The structure includes two distinct and separate valve chambers situated above the cylinder (Fig. 5). Each valve chamber contains two valves of

the same type (*i.e.*, either two suction valves or two discharge valves). The disclosure indicates that two of the four valves could be placed below the cylinder and two above the cylinder but that the inventor believes it preferable to arrange them all above the

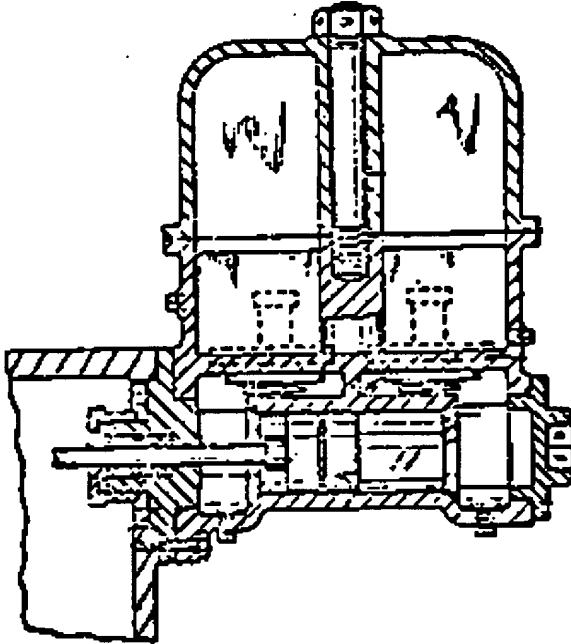


Fig. 5  
(Shallenberg)

D. Kovach.

Kovach, U.S. Patent No. 1,946,166, discloses a particular valve construction for a reciprocating piston air pump. The only feature relied on by the examiner and by the board is that the piston is provided with piston rings as a seal.

#### Obviousness

A. Prior Art and Ordinary Skill in the Art.

[1] Deminski argues that the references applied by the examiner and by the board "are not properly contained within the scope of the [relevant] prior art," *i.e.*, they are "nonanalogous." Deminski contends that none of the references should be considered as prior art because none is directed to the problem of removing worn or damaged valves from compressors. In Deminski's view, the examiner and the board defined the problem too broadly by including both compressors and pumps in the prior art.

Deminski cites *Stratoflex, Inc. v. Aeroquip Corp.*, in which this court stated that "[t]he scope of the prior art has been defined as that 'reasonably pertinent to

cylinder because "that enables more ready installation and removal of the valves."

the particular problem with which the inventor was involved.' " [FN1] The question in *Strato\*442 flex* was whether rubber hose should be considered as prior art relevant to the claimed PTFE tubing. In finding that rubber hose was prior art, the court focused on only the second step of the two-step test for nonanalogous art which test had been stated in *Wood* in the following terms: [FN2]

FN1. *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1535, 218 USPQ 871, 876 (Fed.Cir.1983) (quoting in turn from *In re Wood*, 599 F.2d 1032, 1036, 202 USPQ 171, 174 (CCPA 1979)).

FN2. *Wood*, 599 F.2d at 1036, 202 USPQ at 174.

The determination that a reference is from a nonanalogous art is therefore two-fold. First, we decide if the reference is within the field of the inventor's endeavor. If it is not, we proceed to determine whether the reference is reasonably pertinent to the particular problem with which the inventor was involved.

Here, the references satisfy the first inquiry because they are "within the field of the inventor's endeavor" of horizontally reciprocating, double-acting piston devices for moving fluids. We agree with the board that the cited pumps and compressors have essentially the same function and structure: they move fluids by means of a double-acting piston, a cylinder, and valves. [FN3] Consequently, the field of endeavor is the same for an inventor of either a pump or a compressor of the double-acting piston type. [FN4] Thus, the Pocock "pump" was correctly considered as prior art for the Deminski "compressor." It is even more clear that the British and Kovach references are within Deminski's field of endeavor because they are directed to *compressors* having horizontally reciprocating, double-acting pistons.

FN3. See *In re Ellis*, 476 F.2d 1370, 1372, 177 USPQ 526, 527 (CCPA 1973) (cross reference in official search notes is some evidence of analogy, although "the similarities and differences in structure and function of the inventions disclosed in the references \* \* \* carry far greater weight"). The nearly identical classifications of the application and references in the present case are the result of the close similarity in structure and function of the invention and the prior art.

FN4. Deminski argues at length that the scope of his claims is limited by the language "a high-pressure gas transmission compressor." We need not decide whether the preamble is limiting in this case because the prior art would be the same for either pumps or compressors of the double-acting piston type. We acknowledge, however, that the prior art did not address Deminski's problem of how to remove a large and heavy valve assembly *as a unit*.

#### B. Whether Deminski's Invention Would Have Been Obvious.

We affirm the board's decision insofar as it affirms the examiner's rejection of claims 1, 3, 6, and 7 under 35 U.S.C. § 103 as unpatentable over Pocock in view of the British Patent No. 1,322,774 and Shallenberg. The examiner and the board correctly found that it would have been obvious in view of the British reference to add two more valve chambers to Pocock and in view of Shallenberg to move the cylinder

upwardly so that it is above the bottom of the valve chambers.

We also affirm the rejection of claim 2 under 35 U.S.C. § 103 as unpatentable over Pocock in view of the British reference, Shallenberg, and further in view of Kovach, which teaches the use of a piston ring in a double-acting piston pump.

[2] We reverse the board's decision insofar as it affirms the examiner's rejection of claims 17, 18, and 21. The latter claims have the limitation that the valve sets in each valve chamber be connected in a way which will permit them to be withdrawn as a unit. There is nothing in the prior art references, either singly or in combination, "to suggest the desirability, and thus the obviousness," of designing the valve assembly so that it can be removed as a unit. [FN5]

FN5. *Fromson v. Advance Offset Plate, Inc.*, 755 F.2d 1549, 1556, 225 USPQ 26, 31 (Fed.Cir.1985) (quoting *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1462, 221 USPQ 481, 488 (Fed.Cir.1984) ) (emphasis added in *Fromson* ).

Simply put, Deminski solved the problem of how to remove the valve assembly by designing a compressor with four vertically oriented valve chambers. Each chamber \*443 contains a valve assembly which can be removed as a unit through the opening at the top of the valve chamber. Each of the four valve assembly units may be removed relatively easily by lifting vertically with a hoist.

Pocock teaches a pump in which only the valve *stem* is separately removable and replaceable. The Pocock structure requires the valve pieces to be removed item-by-item, by turning the pump upside down, by using a tool, or by hand. Because the Pocock structure is typically small, Pocock does not address Deminski's problem of how to remove a large and heavy valve assembly *as a unit*. Instead, Pocock teaches away from the invention of claims 17, 18, and 21 of Deminski's patent application.

There was no suggestion in the prior art to provide Deminski with the motivation to design the valve assembly so that it would be removable as a unit. The board argues that if Pocock had followed the "common practice" of attaching the valve stem to the valve structure, then the valve assembly would be removable as a unit. The only way the board could

have arrived at its conclusion was through hindsight analysis by reading into the art Deminski's own teachings. Hindsight analysis is clearly improper, since the statutory test is whether "the subject matter as a whole would have been obvious at the time the invention was made." [FN6]

FN6. 35 U.S.C. § 103 (1982); In re Sponnoble, 405 F.2d 578, 585, 160 USPQ 237, 243 (CCPA 1969).

*Conclusion*

We affirm the board's decision insofar as it affirmed the examiner's rejection of claims 1-3, 6, and 7 in Deminski's patent application. We reverse the board's decision insofar as it affirmed the examiner's rejection of claims 17, 18, and 21 as unpatentable over the prior art under 35 U.S.C. § 103.

AFFIRMED IN PART, REVERSED IN PART.

796 F.2d 436, 230 U.S.P.Q. 313

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United States Court of Appeals, Federal Circuit.  
 In re Rita S. JONES, Michael T. Chirchirillo and  
 Johnny L. Burns.  
**No. 91-1380.**

Feb. 28, 1992.

The Patent and Trademark Office, Board of Patent Appeals, rejected claim of patent and appeal was taken. The Court of Appeals, Rich, Circuit Judge, held that salt of acid commonly known as "dicamba" was not obvious.

Reversed.

## West Headnotes

**[1] Patents** 16.25291k16.25 Most Cited Cases

Patent and Trademark Office failed to present *prima facie* case of obviousness with respect to patent claim for novel salt of acid commonly referred to as "dicamba," used as herbicide; claimed salt was primary amine with ether linkage, structurally different from diethanolamino salt disclosed by closest prior art, which was secondary amine without ether linkage, and there was no evidence that one of ordinary skill in herbicidal art would have been motivated to make modifications of prior art salt needed to arrive at claimed salt. 35 U.S.C.A. § 103.

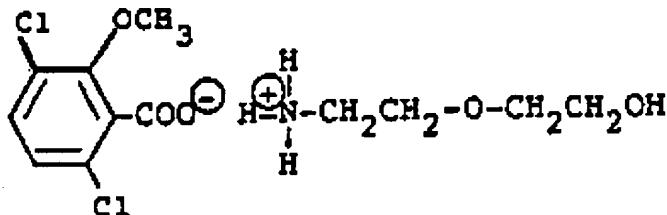
**[2] Patents** 16.25291k16.25 Most Cited Cases

Disclosure of chemical genus does not render obvious any species that happens to fall within it.

**[3] Patents** 114.16291k114.16 Most Cited Cases

(Formerly 291k114.15)

Before Patent and Trademark Office may combine disclosures of two or more prior art references in order to establish *prima facie* obviousness, there must



be some suggestion for doing so, found either in references themselves or in knowledge generally available to one of ordinary skill in art. 35 U.S.C.A. § 103.

\***348** Melvyn M. Kassenoff, Sandoz Corp. Patent & Trademark Dept., East Hanover, N.J., argued for appellant; Gerald D. Sharkin and Richard E. Vila, East Hanover, N.J. and Joanne M. Giesser, Palo Alto, Cal., on brief.

Harris A. Pitlock, Associate Sol., Arlington, Va., argued for appellee; Fred E. McKelvey, Sol., on brief (Richard E. Schafer, Patent & Trademark Office, of counsel).

Before RICH, ARCHER, and CLEVINGER, Circuit Judges.

RICH, Circuit Judge.

Rita S. Jones et al. (collectively Jones) appeal from the April 15, 1991 decision of the Patent and Trademark Office (PTO) Board of Patent Appeals and Interferences (Board), Appeal No. 90-1920, sustaining the rejection of claim 1, the only claim of application Ser. No. 07/099,279, titled "The 2-(2'-Aminoethoxy)-Ethanol Salt of Dicamba," as unpatentable under 35 U.S.C. § 103. We conclude that the PTO has not presented a *prima facie* case of obviousness, and therefore reverse.

## The Invention

The claimed invention is a novel salt of 2-methoxy-3,6-dichlorobenzoic acid, which acid is commonly referred to as "dicamba." A known herbicide, dicamba has typically been sold in the form of its known dimethylamine salt.

The sole claim of the application on appeal reads:

1. The 2-(2'-aminoethoxy) ethanol salt of dicamba. The claimed salt has the following structure:

\*349 The Rejection

Claim 1 stands rejected as obvious in view of the combined teachings of the following references:

Richter	U.S. Patent No. 3,013,054	Dec. 12, 1961
Moyle et al.	U.S. Patent No. 3,056,669	Oct. 2, 1962
Balassa	U.S. Patent No. 3,725,031	Apr. 3, 1973
Zorayan et al.	88 Chem. Abstracts No. 52300j	1978
Wideman	86 Chem. Abstracts No. 43711a	1977

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Richter, which all agree is the closest prior art, discloses dicamba in free acid, ester, and salt forms, for use as a herbicide. Among the salt forms disclosed are substituted ammonium salts, a genus which admittedly encompasses the claimed salt. Richter does not specifically disclose the claimed 2-(2'-aminoethoxy) ethanol salt, however. Most notably, Richter discloses (emphasis and bracketed word ours):

Compositions in which X is substituted ammonium are amine salts of 2-methoxy-3,6-dichlorobenzoic acid [dicamba] and are prepared by the addition of the free acid to various amines. Typical amines which can be used to prepare such amine salts are dimethylamine, trimethylamine, triethylamine, diethanolamine, triethanolamine, isopropylamine, morpholine, and the like. *The resulting products are, respectively, the dimethylamino, trimethylamino, triethylamino, diethanolamino, triethanolamino, isopropylamino, and morpholino salts of 2-methoxy-3,6-dichlorobenzoic acid.*

Zorayan teaches the amine ( $H_2N(CH_2CH_2O)_2H$ ) used to make the claimed salt, as well as the use of that amine in the preparation of surfactants for shampoos, bath preparations, and emulsifiers.

Wideman also teaches the amine disclosed in Zorayan.

The content of the remaining references is unnecessary to our decision.

The Board upheld the examiner's rejection of claim 1 as obvious, finding that the claimed 2-(2'-aminoethoxy) ethanol salt of dicamba and the diethanolamine salt of dicamba specifically disclosed by Richter were "closely related in structure," and that based upon the expectation that "compounds similar in structure will have similar properties," a *prima facie* case of obviousness had arisen. The Board found that Jones' rebuttal evidence (Rule 132 declarations and data reported in the specification) failed

to "compare the claimed subject matter with the closest prior art," and accordingly did not serve to rebut the *prima facie* case. This appeal followed.

Analysis

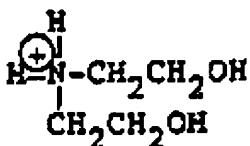
[1][2] The Solicitor contends that the claimed salt falls within the genus of substituted amine salts of dicamba disclosed by Richter, and that, like Richter's genus, the claimed compound has herbicidal activity. Thus, the Solicitor urges, under the circumstances of this case, (1) the genus/species relationship and (2) the common utility of the claimed and prior art compounds support the Board's holding of *prima facie* obviousness. Moreover, the Solicitor adds, although the claimed compound is neither a homolog nor a position isomer of those salts specifically disclosed in Richter, it is structurally similar thereto, particularly the diethanolamino salt noted by the Board.

The question of "structural similarity" in chemical patent cases has generated a body of patent law unto itself. [FN1] Particular types \*350 or categories of structural similarity without more have, in past cases, given rise to *prima facie* obviousness; see, e.g., *In re Dillon*, 919 F.2d 688, 692-94, 16 USPQ2d 1897, 1900-02 (Fed.Cir.1990) (tri-orthoesters and tetra-orthoesters), cert. denied, 500 U.S. 904, 111 S.Ct. 1682, 114 L.Ed.2d 77 (1991); *In re May*, 574 F.2d 1082, 197 USPQ 601 (CCPA 1978) (stereoisomers); *In re Wilder*, 563 F.2d 457, 195 USPQ 426 (CCPA 1977) (adjacent homologs and structural isomers); *In re Hoch*, 428 F.2d 1341, 166 USPQ 406 (CCPA 1970) (acid and ethyl ester). However, none of these types of structural similarity are involved here. And in any event, this court has previously stated that generalization is to be avoided insofar as specific structures are alleged to be *prima facie* obvious one from the other. *In re Grabiak*, 769 F.2d 729, 731, 226 USPQ 870, 872 (Fed.Cir.1985).

FN1. See generally Helmuth A. Wegner, "Prima Facie Obviousness of Chemical Compounds," 6

*Am.Pat.L.Assoc.Q.J.* 271 (1978).

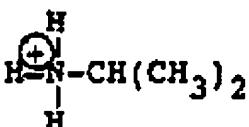
On the basis of the record before us, we cannot sustain the Board's conclusion that the claimed salt and the diethanolamino salt disclosed by Richter are so "closely related in structure" as to render the former *prima facie* obvious in view of the latter. The claimed salt is a primary amine with an ether linkage. The diethanolamino salt disclosed by Richter is a secondary amine, without an ether linkage:



In addition, the only substituted ammonium salt of dicamba expressly disclosed by Richter having an ether linkage is the morpholino salt, which is *cyclic* in structure:



The claimed salt is, plainly, *acyclic*; i.e., linear. Lastly, while the isopropylamino salt disclosed by Richter is a primary amine, as is the claimed salt, its iso- structure is quite different:



The lack of close similarity of structure is not negated by the fact that the claimed salt is a member of Richter's broadly disclosed genus of substituted ammonium salts of dicamba. The Solicitor contends that "[t]he relative size of the genus disclosed by the prior art would not appear to be a controlling factor in determining whether a *prima facie* case of obviousness exists for a species encompassed within the described genus," citing *Merck & Co. v. Biocraft Labs., Inc.*, 874 F.2d 804, 806-09, 10 USPQ2d 1843, 1845-48 (Fed.Cir.), cert. denied, 493 U.S. 975, 110 S.Ct. 498, 107 L.Ed.2d 502 (1989). We decline to extract from *Merck* the rule that the Solicitor appears to suggest--that regardless of how broad, a disclosure of a chemical genus renders obvious any species that happens to fall within it. In *Merck*, at issue on appeal was whether claims to a composition of two diuretics, amiloride and hydrochlorothiazide, present in a particular "medically synergistic" weight ratio, would have been obvious in view of a specific prior art disclosure of amiloride in combination with hydrochlorothiazide, one of 1200 such

combinations disclosed in the prior art reference. *Id.* at 806, 10 USPQ2d at 1845. Based on the facts before it, including evidence at trial that the experimentation needed to arrive at the claimed dosage was "nothing more than routine," *id.* at 809, 10 USPQ2d at 1847, the court held that the claimed invention would have been obvious. In contrast, though Richter discloses the potentially infinite genus of "substituted ammonium salts" of dicamba, and lists several such salts, the salt claimed here is not specifically disclosed. Nor, as we have explained above, is the claimed salt sufficiently similar in structure to those specifically disclosed in Richter as to render it *prima facie* obvious. Every case, particularly those raising the issue of obviousness under section 103, must necessarily be decided upon its own facts.

[3] \*351 The Solicitor points out that, given the breadth of forms of dicamba (free acid, ester, or salt) disclosed by Richter as having herbicidal utility, one of ordinary skill in the art would appreciate that the dicamba group has significance with respect to imparting herbicidal activity to dicamba compounds. Thus, the Solicitor contends, one skilled in the art would have been motivated to use, with dicamba, substituted ammonium salts made from a known amine, such as the amine disclosed by Zorayan and Wideman, and would have expected such a salt to have herbicidal activity. Before the PTO may combine the disclosures of two or more prior art references in order to establish *prima facie* obviousness, there must be some suggestion for doing so, found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598-99 (Fed.Cir.1988). We see no such suggestion in Zorayan, which is directed to shampoo additives, nor in Wideman, which teaches that the amine used to make the claimed compound is a byproduct of the production of morpholine. Nor does the broad disclosure of Richter fill the gap, for the reasons discussed above.

Conspicuously missing from this record is any *evidence*, other than the PTO's speculation (if it be called *evidence*) that one of ordinary skill in the herbicidal art would have been motivated to make the modifications of the prior art salts necessary to arrive at the claimed 2-(2'-aminoethoxy) ethanol salt. See *Grabiak*, 769 F.2d at 731-32, 226 USPQ at 872 ("[I]n the case before us there must be adequate support in the prior art for the [prior art] ester/ [claimed] thioester change in structure, in order to complete the PTO's *prima facie* case and shift the burden of going forward to the applicant."); *In re Lalu*, 747 F.2d 703, 705, 223 USPQ 1257, 1258 (Fed.Cir.1984) ("The prior art must provide one of ordinary skill in the art the motivation to make the proposed molecular modifications needed to arrive at the claimed compound.")

Conclusion

We conclude that the PTO did not establish a *prima facie* case of obviousness, and thus did not shift to Jones the burden of coming forward with unexpected results or other objective evidence of non-obviousness. Accordingly, the decision of the Board is

REVERSED.

958 F.2d 347, 60 USLW 2588, 21 U.S.P.Q.2d 1941

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### Briefs and Other Related Documents

United States Court of Appeals,  
Federal Circuit.  
In re Werner KOTZAB.  
No. 99-1231.  
(Reexamination No. 90/004,441).

June 30, 2000.

In reexamination proceeding, the Board of Patent Appeals and Interferences held that claims in patent involving temperature-controlled injection molding method for forming plastic articles were unpatentable for obviousness. Patentee appealed. The Court of Appeals, Linn, Circuit Judge, held that patent claims were not rendered obvious by prior art reference.

Reversed.

West Headnotes

#### [1] Patents 16(3)

##### 291k16(3) Most Cited Cases

A claimed invention is unpatentable if the differences between it and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art. 35 U.S.C.A. § 103(a).

#### [2] Patents 16.13

##### 291k16.13 Most Cited Cases

The ultimate determination of whether an invention would have been obvious under the patent statute is a legal conclusion based on underlying findings of fact. 35 U.S.C.A. § 103(a).

#### [3] Patents 113(6)

##### 291k113(6) Most Cited Cases

Court of Appeals reviews de novo an ultimate determination of obviousness by the Board of Patent Appeals and Interferences, but reviews the Board's underlying factual findings for substantial evidence. 35 U.S.C.A. § 103(a).

#### [4] Federal Courts 846

##### 170Bk846 Most Cited Cases

Substantial evidence is something less than the

weight of the evidence but more than a mere scintilla of evidence, and, in reviewing the record for substantial evidence, Court of Appeals must take into account evidence that both justifies and detracts from the factual determinations.

#### [5] Patents 113(6)

##### 291k113(6) Most Cited Cases

The possibility of drawing two inconsistent conclusions from the evidence does not prevent findings of the Board of Patent Appeals and Interferences from being supported by substantial evidence; indeed, if a reasonable mind might accept the evidence as adequate to support the factual conclusions drawn by the Board, then Court of Appeals must uphold the Board's determination.

#### [6] Patents 16(3)

##### 291k16(3) Most Cited Cases

#### [6] Patents 16(4)

##### 291k16(4) Most Cited Cases

Critical step in analyzing the patentability of claims, as to obviousness, is casting the mind back to the time of invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then-accepted wisdom in the field, and close adherence to this methodology is especially important in cases where the very ease with which the invention can be understood may prompt one to fall victim to the insidious effect of a hindsight syndrome wherein that which only the invention taught is used against its teacher. 35 U.S.C.A. § 103(a).

#### [7] Patents 26(1)

##### 291k26(1) Most Cited Cases

Identification in the prior art of each individual part claimed in a patent is insufficient to defeat patentability of the whole claimed invention; rather, to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion, or teaching of the desirability of making the specific combination that was made by the applicant. 35 U.S.C.A. § 103(a).

#### [8] Patents 16.5(1)

##### 291k16.5(1) Most Cited Cases

Even when obviousness is based on a single prior art reference, there must be a showing of a suggestion or motivation to modify the teachings of that reference.

35 U.S.C.A. § 103(a).

**[9] Patents  26(1)**

291k26(1) Most Cited Cases

The motivation, suggestion, or teaching to combine prior art elements, as would support a finding of obviousness, may come explicitly from statements in the prior art, the knowledge of one of ordinary skill in the art, or, in some cases the nature of the problem to be solved. 35 U.S.C.A. § 103(a).

**[10] Patents  26(1)**

291k26(1) Most Cited Cases

The teaching, motivation, or suggestion to combine prior art elements that would support a finding of obviousness may be implicit from the prior art as a whole, rather than expressly stated in the references; the test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art. 35 U.S.C.A. § 103(a).

**[11] Patents  36(1)**

291k36(1) Most Cited Cases

Whether the Board of Patent Appeals and Interferences relies on an express or an implicit showing of some motivation, suggestion, or teaching to combine prior art elements, in analyzing obviousness of patent, it must provide particular findings related thereto; broad conclusory statements standing alone are not evidence. 35 U.S.C.A. § 103(a).

**[12] Patents  16.14**

291k16.14 Most Cited Cases

Patent claims involving temperature-controlled injection molding method for forming plastic articles were not rendered obvious by prior art reference, as prior art reference did not teach or suggest use of single temperature sensor to control plurality of flow control valves, as set forth by patent claims. 35 U.S.C.A. § 103(a).

**Patents  328(2)**

291k328(2) Most Cited Cases

5,427,720. Valid.

\*1367 Robert F.I. Conte, Lee, Mann, Smith, McWilliams, Sweeney & Ohlson, of Chicago, Illinois, argued for appellant. Of counsel were Thomas Eugene Smith and James B. Conte.

Mark Nagumo, Associate Solicitor, U.S. Patent and Trademark Office, of Arlington, Virginia, argued for

the appellee. With him on the brief were Albin F. Drost, Acting Solicitor, John M. Whealan, Acting Deputy Solicitor, and Stephen Walsh, Associate Solicitor.

Before LOURIE, GAJARSA, and LINN, Circuit Judges.

LINN, Circuit Judge.

**DECISION**

Werner Kotzab appeals from the final decision of the Board of Patent Appeals and Interferences ("Board") holding claims 1-10 in reexamination number 90/004,441 unpatentable for obviousness under 35 U.S.C. § 103(a). See *Ex Parte Kotzab*, Paper No. 17 (BPAI July 15, 1998). This case was submitted for our decision following oral argument on April 4, 2000. Because certain of the Board's key factual findings relating to its obviousness analysis are not supported by substantial evidence, and because the Board erred in concluding that the claims would have been obvious as a matter of law, we reverse.

**BACKGROUND**

**A. The Invention**

The invention involves an injection molding method for forming plastic articles. In such methods, the temperature of the mold must be controlled so that the plastic can harden uniformly throughout the mold. Kotzab was confronted with the problem of providing optimal temperature control for an injection molding method to ensure the quality of the final product on the one hand, and achieving optimally short molding cycle times on the other hand. He arrived at a solution which is embodied in claim 1 of the reexamination as follows:

1. An improved method of controlling the temperature of an injection mold by pressure feeding molding material into a mold recess of an injection mold by an extruder, curing the material in the mold, and removing molded material from the mold, said pressure feeding, curing, and removing being a molding cycle of recurring molding cycles and said recurring molding cycles having at least a first molding cycle and a second molding cycle, comparing a preset nominal temperature to an actual temperature measured by at least one temperature sensor during said first molding cycle and said second molding cycle and supplying an amount of a temperature controlling medium to the first molding cycle and the second molding cycle, said amount of temperature controlling medium being dependent on the deviation between the

actual temperature measured and the desired preset nominal temperature, the improvement comprising: controlling, via a single sensor, a plurality of flow control valves for the temperature \*1368 controlling medium to provide impulse temperature control medium to the first and second molding cycles, determining empirically or by calculation a quantitative spacial distribution of temperature controlling medium needed to obtain said desired preset nominal temperature during at least the first molding cycle and the second molding cycle and determining empirically or by calculation the conduits needed to be utilized to obtain the desired preset nominal temperature during at least the first molding cycle and the second molding cycle, comparing said desired preset nominal temperature to said actual temperature, at least once during the first molding cycle and the second molding cycle at a certain point in time being the same for each said molding cycle, such that said comparison made during said first cycle is synchronized with said comparison made during said second subsequent molding cycle, and said plurality of flow control valves are triggered during each said cycle to provide said impulse control medium, and said triggering being dependent on the deviation of temperature determined for each said comparison and also being dependent on a stored profile of said quantitative spacial distribution of the temperature controlling medium.

J.A. at 18-19.

Claim 3, which depends from claim 1, adds the following further limitation: "wherein a flow measuring turbine is associated with each flow control valve to detect the actual flow in each cycle and wherein a proportioning of a cooling or heating medium is effected in dependence on a comparison of a nominal flow to the actual flow." *Id.* at 19.

Claim 10, which depends from claim 3, additionally provides that "the rotation of said measuring turbine is transferred into pulses, so that the nominal flow [of the temperature controlling medium] can be fixed by the presetting of a corresponding number of pulses." *Id.* at 20.

#### B. The Reexamination Proceeding

U.S. Patent 5,427,720 ("the '720 patent") issued to Kotzab on June 27, 1995. A third party filed a request for reexamination on November 4, 1996. The reexamination was granted and assigned control no. 90/004,441. The amended claims were finally rejected by the Examiner, and Kotzab appealed the

rejections to the Board. On July 15, 1998, the Board affirmed the Examiner's rejection of the claims for essentially the reasons expressed in the Examiner's Answer. The Board did, however, provide its own additional comments primarily for emphasis.

Specifically, the Board agreed with the Examiner that WO 92/08598 ("Evans") discloses a process of controlling the temperature of an injection mold by using a sensor to control the pulsing of a temperature control medium through the mold. Moreover, the Board found, as explained by the Examiner, that Evans discloses in a less preferred embodiment, using only one temperature measurement to control the coolant pulses rather than an average temperature measurement. See Evans application, p. 6, II. 17-23.

In addition, the Board found that Evans discloses that "the optimum timing of the cooling flow can be selected in accordance with the known temperature of the mould." *Id.* at II. 6-8. Furthermore, the Board found that a prior art promotional article discloses that manipulation of the geometry and layout of the cooling segment provides for the greatest improvement in molding cycle. See Horst Wieder, *Understanding the pulse modulated mold temperature control method*, (CITO Products, Inc., WI.) 1987, at p. 1, col. 2, II. 13-16. And, the Board determined that a May 1984 prior art article indicates that it was known to establish a cooling regime before the mold is produced, and that the determination of the cooling regime includes the number and location of the cooling conduits, as well as the volume of the coolant flow. Thus, the Board concluded that the evidence of record indicates that it \*1369 was known in the art to utilize empirical data to design the mold and the distribution of cooling channels in that mold. In view of the foregoing, the Board found that the empirical determination of the necessary spacial distribution of the length of the cooling pulses needed for delivering the appropriate coolant is disclosed by Evans or was known at the time the invention was made. Consequently, the Board affirmed the Examiner's rejection of claims 1, 2, and 4-9 under 35 U.S.C. § 103(a) as being unpatentable over Evans.

The Board made additional findings related to claims 3 and 10 in determining that they were also unpatentable under 35 U.S.C. § 103(a) over Evans in view of certain secondary references.

Kotzab filed a request for reconsideration, which the Board denied on November 24, 1998. In that decision, the Board reiterated agreement with the

Examiner that it would have been obvious for one of ordinary skill in the art to utilize only one temperature measurement to control the coolant pulses in light of the Evans disclosure. Kotzab timely appealed the Board's decision to this court. We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(4)(A) (1994).

## DISCUSSION

### A. Standard of Review

[1][2][3] A claimed invention is unpatentable if the differences between it and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art. *See 35 U.S.C. § 103(a)* (Supp. III 1997); *In re Dembicza*k, 175 F.3d 994, 998, 50 USPQ2d 1614, 1616 (Fed.Cir.1999). The ultimate determination of whether an invention would have been obvious under 35 U.S.C. § 103(a) is a legal conclusion based on underlying findings of fact. *See Dembicza*k, 175 F.3d at 998, 50 USPQ2d at 1616. We review the Board's ultimate determination of obviousness de novo. *See id.* However, we review the Board's underlying factual findings for substantial evidence. *See In re Gartside*, 203 F.3d 1305, 1316, 53 USPQ2d 1769, 1776 (Fed.Cir.2000).

[4][5] Substantial evidence is something less than the weight of the evidence but more than a mere scintilla of evidence. *See id.* at 1312, 203 F.3d 1305, 53 USPQ2d at 1773 (quoting *Consolidated Edison Co. v. NLRB*, 305 U.S. 197, 229-30, 59 S.Ct. 206, 83 L.Ed. 126 (1938)). In reviewing the record for substantial evidence, we must take into account evidence that both justifies and detracts from the factual determinations. *See id.* (citing *Universal Camera Corp. v. NLRB*, 340 U.S. 474, 487-88, 71 S.Ct. 456, 95 L.Ed. 456 (1951)). We note that the possibility of drawing two inconsistent conclusions from the evidence does not prevent the Board's findings from being supported by substantial evidence. *See id.* Indeed, if a reasonable mind might accept the evidence as adequate to support the factual conclusions drawn by the Board, then we must uphold the Board's determination. *See id.*

### B. Analysis

[6] A critical step in analyzing the patentability of claims pursuant to section 103(a) is casting the mind back to the time of invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then-accepted wisdom in the field. *See Dembicza*k, 175 F.3d at 999, 50 USPQ2d at 1617. Close adherence to this

methodology is especially important in cases where the very ease with which the invention can be understood may prompt one "to fall victim to the insidious effect of a hindsight syndrome wherein that which only the invention taught is used against its teacher." *Id.* (quoting *W.L. Gore & Assocs., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 USPQ 303, 313 (Fed.Cir.1983)).

[7][8] Most if not all inventions arise from a combination of old elements. *See In re Rouffet*, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457 (Fed.Cir.1998). Thus, \*1370 every element of a claimed invention may often be found in the prior art. *See id.* However, identification in the prior art of each individual part claimed is insufficient to defeat patentability of the whole claimed invention. *See id.* Rather, to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant. *See In re Dance*, 160 F.3d 1339, 1343, 48 USPQ2d 1635, 1637 (Fed.Cir.1998); *In re Gordon*, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed.Cir.1984). Even when obviousness is based on a single prior art reference, there must be a showing of a suggestion or motivation to modify the teachings of that reference. *See B.F. Goodrich Co. v. Aircraft Braking Sys. Corp.*, 72 F.3d 1577, 1582, 37 USPQ2d 1314, 1318 (Fed.Cir.1996).

[9][10][11] The motivation, suggestion or teaching may come explicitly from statements in the prior art, the knowledge of one of ordinary skill in the art, or, in some cases the nature of the problem to be solved. *See Dembicza*k, 175 F.3d at 999, 50 USPQ2d at 1617. In addition, the teaching, motivation or suggestion may be implicit from the prior art as a whole, rather than expressly stated in the references. *See WMS Gaming, Inc. v. International Game Tech.*, 184 F.3d 1339, 1355, 51 USPQ2d 1385, 1397 (Fed.Cir.1999). The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art. *See In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 881 (1981) (and cases cited therein). Whether the Board relies on an express or an implicit showing, it must provide particular findings related thereto. *See Dembicza*k, 175 F.3d at 999, 50 USPQ2d at 1617. Broad conclusory statements standing alone are not "evidence." *Id.*

[12] Kotzab's primary argument that the Board erred in holding claims 1-10 unpatentable under 35 U.S.C. § 103(a) over Evans, or Evans in view of secondary references, is that Evans does not teach or suggest the use of a single temperature sensor to control a plurality of flow control valves. We agree.

As noted previously, the Board adopted the Examiner's reasoning in upholding the rejection of the claims and added further comments. None of the Board's comments relate to the issue of Evans teaching or suggesting the use of one *sensor* to control a number of valves regulating coolant flow to the mold. Thus, we look to the Examiner's reasons for finding this limitation to be expressly taught or suggested in Evans.

The Examiner cites Evans for teaching that "one *system* constructed and operated according to the invention may be used to control a number of valves." Evans application, p. 19, II. 6-8 (emphasis added). In view of this disclosure only, the Examiner concluded that Evans teaches the use of one *sensor* to control a number of valves. This conclusion must necessarily rest on the unstated premise by the Examiner that "one system" is equal to "one sensor."

But the Board's decision, adopting the Examiner's premise, lacks the necessary substantial evidence to support a rejection of Kotzab's claims. Specifically, there is not substantial evidence to show that "one system" is the same thing as "one sensor." The words "sensor" and "probe" are used throughout Evans to refer to the device that measures the mold temperature. Evans uses the word "signal" to refer to the response generated by the measured temperature that controls the valves for coolant flow. Finally, the word "system" is used in Evans to refer to the overall temperature control system that is responsible for the valve timing for coolant flow to increase or decrease the temperature of the mold. Evans clearly never uses the term "system" as a substitute for the simple temperature measuring device it calls "sensor." And, the Board made no reference to any evidence in the record that \*1371 would equate "one system" with "one sensor."

As mentioned previously, more than a mere scintilla of evidence is necessary to support the Board's implicit conclusion that "one system" is equal to "one sensor." Based on the entirety of Evans' disclosure, we cannot say that there is such relevant evidence as a reasonable mind might accept as adequate to support the conclusion that "one system" means "one sensor."

The United States Patent and Trademark Office argues that because Evans teaches that a single sensor may be used to provide "the temperature measurement at a selected part of the machine," it necessarily follows that the Evans "system" discussed later may have a single sensor--and that single sensor may control more than one valve. *See id.* at p. 6, II. 21-23; p. 19, II. 6-8. While the test for establishing an implicit teaching, motivation, or suggestion is what the combination of these two statements of Evans would have suggested to those of ordinary skill in the art, the two statements cannot be viewed in the abstract. Rather, they must be considered in the context of the teaching of the entire reference. Further, a rejection cannot be predicated on the mere identification in Evans of individual components of claimed limitations. Rather, particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed.

We do not take issue with the argument that Evans suggests the concept of using the historic temperature obtained by one temperature measurement to control coolant pulses. *See id.* at p. 5, II. 14-22; p. 6, II. 17-23. However, there is not substantial evidence of record to extrapolate this teaching to the multiple zone system described later in Evans. *See id.* at p. 18, I. 22 to p. 19, I. 8. In the multiple zone system, Evans describes the use of a temperature sensor and an associated flow control valve in each zone. At most, the combined teachings suggest that the historic temperature of a mold zone may be measured by one sensor, and as part of a multiple zone system where multiple valves are controlled, that one sensor measurement can be used to control the valve for that zone. Thus, we cannot say that there is such relevant evidence as a reasonable mind might accept as adequate to support the conclusion that where there are a plurality of control valves in a multiple zone setting, only one temperature sensor provides the control for a plurality of valves.

Moreover, we cannot say that there is such relevant evidence as a reasonable mind might accept as adequate to support implicitly the conclusion that a skilled artisan confronted with (1) the problem noted by Kotzab, i.e., providing optimal temperature control for an injection molding method to ensure the quality of the final product on the one hand, and achieving optimally short molding cycle times on the other hand, and (2) the two statements in Evans, would have been motivated to control a plurality of

valves in a multiple zone setting with only one temperature sensor.

In this case, the Examiner and the Board fell into the hindsight trap. The idea of a single sensor controlling multiple valves, as opposed to multiple sensors controlling multiple valves, is a technologically simple concept. With this simple concept in mind, the Patent and Trademark Office found prior art statements that in the abstract appeared to suggest the claimed limitation. But, there was no finding as to the specific understanding or principle within the knowledge of a skilled artisan that would have motivated one with no knowledge of Kotzab's invention to make the combination in the manner claimed. In light of our holding of the absence of a motivation to combine the teachings in Evans, we conclude that the Board did not make out a proper *prima facie* case of obviousness in rejecting claims 1, 2, and 4-9 under 35 U.S.C. § 103(a) over Evans. Moreover, because the rejections of claims 3 and 10 rely upon the foregoing, we also \*1372 conclude that the Board did not make out a proper *prima facie* case of obviousness in rejecting those claims under 35 U.S.C. § 103(a).

#### CONCLUSION

For the above reasons, we conclude that there is not substantial evidence to support the Board's finding of fact that Evans expressly teaches that "one sensor" may be used to control a plurality of valves, and there is not substantial evidence of record, either expressly or implicitly, to modify the teachings of Evans to obtain a system in which one sensor controls a plurality of valves. Accordingly, we

*REVERSE.*

217 F.3d 1365, 55 U.S.P.Q.2d 1313

#### Briefs and Other Related Documents ([Back to top](#))

- [1999 WL 33631198](#) (Appellate Brief) Reply Brief for Appellant (Oct. 28, 1999)[Original Image of this Document \(PDF\)](#)
- [1999 WL 33631159](#) (Appellate Brief) Brief for Appellee Commissioner of Patents and Trademarks (Oct. 12, 1999)[Original Image of this Document \(PDF\)](#)
- [1999 WL 33631196](#) (Appellate Brief) Brief for Appellant (Aug. 30, 1999)[Original Image of this Document with Appendix \(PDF\)](#)

• [99-1231](#) (Docket) (Jan. 22, 1999)

END OF DOCUMENT

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**Briefs and Other Related Documents**

United States Court of Appeals,  
Federal Circuit.  
In re SANG-SU LEE.  
**No. 00-1158.**

Jan. 18, 2002.

Board of Patent Appeals and Interferences rejected all claims of inventor's patent application directed toward method of automatically displaying functions of video display device that demonstrated how to select and adjust functions in order to facilitate response by user. Inventor appealed. The Court of Appeals, Pauline Newman, Circuit Judge, held that analysis by Board did not comport with either legal requirements for determination of obviousness or with requirements of Administrative Procedure Act (APA).

Vacated and remanded.

West Headnotes

**[1] Patents ↗113(6)**

291k113(6) Most Cited Cases

Tribunals of the Patent and Trademark Office (PTO) are governed by the Administrative Procedure Act (APA), and their rulings receive the same judicial deference as do tribunals of other administrative agencies. 5 U.S.C.A. § 551 et seq.

**[2] Administrative Law and Procedure ↗485**

15Ak485 Most Cited Cases

**[2] Administrative Law and Procedure ↗507**

15Ak507 Most Cited Cases

For judicial review to be meaningfully achieved within the strictures of the Administrative Procedures Act (APA), an agency tribunal must present a full and reasoned explanation of its decision; the agency tribunal must set forth its findings and the grounds thereof, as supported by the agency record, and explain its application of the law to the found facts. 5 U.S.C.A. § 706(2).

**[3] Patents ↗113(6)**

**291k113(6) Most Cited Cases**

Judicial review of a decision of the Board of Patent Appeals and Interferences denying an application for a patent is founded on the obligation of the agency to make the necessary findings and to provide an administrative record showing the evidence on which the findings are based, accompanied by the agency's reasoning in reaching its conclusions. 5 U.S.C.A. § 551 et seq.

**[4] Patents ↗31.1**

291k31.1 Most Cited Cases

As applied to the determination of patentability vel non when the issue is obviousness, it is fundamental that the rejection of a patent application must be based on evidence comprehended by the language of the statute addressing obviousness. 35 U.S.C.A. § 103.

**[5] Patents ↗16.5(1)**

291k16.5(1) Most Cited Cases

The patent examination process centers on prior art and the analysis thereof; when patentability turns on the question of obviousness, the search for and analysis of the prior art includes evidence relevant to the finding of whether there is a teaching, motivation, or suggestion to select and combine the references relied on as evidence of obviousness. 35 U.S.C.A. § 103.

**[6] Patents ↗26(1)**

291k26(1) Most Cited Cases

In the context of an obviousness determination by the Board of Patent Appeals and Interferences, the factual inquiry whether to combine references must be thorough and searching; it must be based on objective evidence of record. 35 U.S.C.A. § 103.

**[7] Patents ↗111**

291k111 Most Cited Cases

Analysis of invention by Board of Patent Appeals and Interferences did not comport with either legal requirements for determination of obviousness or with requirements of Administrative Procedure Act (APA) on basis that agency tribunal did not set forth findings and explanations needed for reasoned decisionmaking; examiner used conclusory statements to support his subjective belief that it was obvious that person skilled in the art would have been motivated to combine prior art, and Board rejected need for any specific hint or suggestion in particular

reference to support combination of prior art. 5 U.S.C.A. § 706(2); 35 U.S.C.A. § 103.

**[18] Patents ↗ 26(1)**

291k26(1) Most Cited Cases

In an obviousness determination, the factual question of motivation to combine prior art is material to patentability, and cannot be resolved on subjective belief and unknown authority. 35 U.S.C.A. § 103.

**[19] Patents ↗ 26(1)**

291k26(1) Most Cited Cases

**[19] Patents ↗ 111**

291k111 Most Cited Cases

In an obviousness determination under patent law, it is improper, in determining whether a person of ordinary skill would have been led to combine references, simply to use that which the inventor taught against its teacher; thus, the Board of Patent Appeals and Interferences must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the agency's conclusion. 5 U.S.C.A. § 706(2); 35 U.S.C.A. § 103.

**[10] Administrative Law and Procedure ↗ 507**

15Ak507 Most Cited Cases

Deferential judicial review under the Administrative Procedure Act (APA) does not relieve the agency of its obligation to develop an evidentiary basis for its findings; to the contrary, the APA reinforces this obligation. 5 U.S.C.A. § 706(2).

**[11] Administrative Law and Procedure ↗ 763**

15Ak763 Most Cited Cases

**[11] Administrative Law and Procedure ↗ 796**

15Ak796 Most Cited Cases

In the context of judicial review under the Administrative Procedure Act (APA), a decision by an agency tribunal that has an omission of a relevant factor required by precedent is both legal error and "arbitrary agency action." 5 U.S.C.A. § 551 et seq.

**[12] Administrative Law and Procedure ↗ 485**

15Ak485 Most Cited Cases

**[12] Administrative Law and Procedure ↗ 760**

15Ak760 Most Cited Cases

The foundation of the principle of judicial deference under the Administrative Procedures Act (APA) to

the rulings of agency tribunals is that the tribunal has specialized knowledge and expertise, such that when reasoned findings are made, a reviewing court may confidently defer to the agency's application of its knowledge in its area of expertise; however, reasoned findings are critical to the performance of agency functions and judicial reliance on agency competence. 5 U.S.C.A. § 706(2).

**[13] Patents ↗ 16(1)**

291k16(1) Most Cited Cases

The determination of patentability on the ground of unobviousness is ultimately one of judgment; in furtherance of the judgmental process, the patent examination procedure serves both to find, and to place on the official record, that which has been considered with respect to patentability. 35 U.S.C.A. § 103.

**[14] Patents ↗ 16(3)**

291k16(3) Most Cited Cases

**[14] Patents ↗ 104**

291k104 Most Cited Cases

**[14] Patents ↗ 111**

291k111 Most Cited Cases

In the context of an obviousness determination, the patent examiner and the Board of Patent Appeals and Interferences are deemed to have experience in the field of the invention; however, this experience, insofar as applied to the determination of patentability, must be applied from the viewpoint of the person having ordinary skill in the art to which said subject matter pertains. 35 U.S.C.A. § 103.

**[15] Patents ↗ 104**

291k104 Most Cited Cases

In finding the relevant facts, in assessing the significance of the prior art, and in making the ultimate determination of the issue of obviousness, the examiner and the Board of Patent Appeals and Interferences are presumed to act from the viewpoint of a person having ordinary skill in the art to which the subject matter pertains; thus, when they rely on what they assert to be general knowledge to negate patentability, that knowledge must be articulated and placed on the record and the failure to do so is not consistent with either effective administrative procedure or effective judicial review. 5 U.S.C.A. § 706(2); 35 U.S.C.A. § 103.

**[16] Patents ↗ 111**

291k111 Most Cited Cases

In the context of an obviousness determination, the Board of Patent Appeals and Interferences cannot rely on conclusory statements when dealing with particular combinations of prior art and specific claims, but must set forth the rationale on which it relies. 5 U.S.C.A. § 706(2); 35 U.S.C.A. § 103.

[17] **Administrative Law and Procedure** 326  
15Ak326 Most Cited Cases

[17] **Administrative Law and Procedure** 485  
15Ak485 Most Cited Cases

[17] **Administrative Law and Procedure** 507  
15Ak507 Most Cited Cases

Sound administrative procedure requires that an agency apply the law in accordance with statute and precedent; the agency tribunal must make findings of relevant facts, and present its reasoning in sufficient detail that the court may conduct meaningful review of the agency action. 5 U.S.C.A. § 706(2).

**Patents** 328(2)  
291k328(2) Most Cited Cases

4,626,892. Cited As Prior Art.

\*1340 Richard H. Stern, of Washington, DC, argued for Sang Su Lee. With him on the brief was Robert E. Bushnell.

Sidney O. Johnson, Jr., Associate Solicitor, of Arlington, Virginia, argued for the Director of the U.S. Patent and Trademark Office. With him on the brief were John M. Whealan, Solicitor, and Raymond T. Chen, Associate Solicitor. Of counsel were Maximilian R. Peterson and Mark Nagumo, Associate Solicitors.

Before PAULINE NEWMAN, CLEVINGER, and DYK, Circuit Judges.

PAULINE NEWMAN, Circuit Judge.

Sang-Su Lee appeals the decision of the Board of Patent Appeals and Interferences of the United States Patent and Trademark Office, rejecting all of the claims of Lee's patent application Serial No. 07/631,210 entitled "Self-Diagnosis and Sequential-Display Method of Every Function." [FN1] We vacate the Board's decision for failure to meet the adjudicative standards for review under the Administrative Procedure Act, and remand for further proceedings.

FN1. *Ex parte Lee*, No.1994-1989 (Bd.

Pat.App. & Int. Aug. 30, 1994; on reconsid'n Sept. 29, 1999).

### The Prosecution Record

Mr. Lee's patent application is directed to a method of automatically displaying the functions of a video display device and demonstrating how to select and adjust the functions in order to facilitate response by the user. The display and demonstration are achieved using computer-managed electronics, including pulse-width modulation and auto-fine-tuning pulses, in accordance with procedures described in the specification. Claim 10 is representative:

10. A method for automatically displaying functions of a video display device, comprising: determining if a demonstration mode is selected; if said demonstration mode is selected, automatically entering a picture adjustment mode having a picture menu screen displaying a list of a plurality of picture functions; and automatically demonstrating selection and adjustment of individual ones of said plurality of picture functions.

The examiner rejected the claims on the ground of obviousness, citing the combination of two references: United States Patent No. 4,626,892 to Nortrup, and the Thunderchopper Helicopter Operations \*1341 Handbook for a video game. The Nortrup reference describes a television set having a menu display by which the user can adjust various picture and audio functions; however, the Nortrup display does not include a demonstration of how to adjust the functions. The Thunderchopper Handbook describes the Thunderchopper game's video display as having a "demonstration mode" showing how to play the game; however, the Thunderchopper Handbook makes no mention of the adjustment of picture or audio functions. The examiner held that it would have been obvious to a person of ordinary skill to combine the teachings of these references to produce the Lee system.

Lee appealed to the Board, arguing that the Thunderchopper Handbook simply explained how to play the Thunderchopper game, and that the prior art provided no teaching or motivation or suggestion to combine this reference with Nortrup, or that such combination would produce the Lee invention. The Board held that it was not necessary to present a source of a teaching, suggestion, or motivation to combine these references or their teachings. The Board stated:

The conclusion of obviousness may be made from common knowledge and common sense of a person

of ordinary skill in the art without any specific hint or suggestion in a particular reference.

Board op. at 7. The Board did not explain the "common knowledge and common sense" on which it relied for its conclusion that "the combined teachings of Nortrup and Thunderchopper would have suggested the claimed invention to those of ordinary skill in the art."

Lee filed a request for reconsideration, to which the Board responded after five years. The Board reaffirmed its decision, stating that the Thunderchopper Handbook was "analogous art" because it was "from the same field of endeavor" as the Lee invention, and that the field of video games was "reasonably pertinent" to the problem of adjusting display functions because the Thunderchopper Handbook showed video demonstrations of the "features" of the game. On the matter of motivation to combine the Nortrup and Thunderchopper references, the Board stated that "we maintain the position that we stated in our prior decision" and that the Examiner's Answer provided "a well reasoned discussion of why there is sufficient motivation to combine the references." The Board did not state the examiner's reasoning, and review of the Examiner's Answer reveals that the examiner merely stated that both the Nortrup function menu and the Thunderchopper demonstration mode are program features and that the Thunderchopper mode "is user-friendly" and it functions as a tutorial, and that it would have been obvious to combine them.

Lee had pressed the examiner during prosecution for some teaching, suggestion, or motivation in the prior art to select and combine the references that were relied on to show obviousness. The Examiner's Answer before the Board, plus a Supplemental Answer, stated that the combination of Thunderchopper with Nortrup "would have been obvious to one of ordinary skill in the art since the demonstration mode is just a programmable feature which can be used in many different device[s] for providing automatic introduction by adding the proper programming software," and that "another motivation would be that the automatic demonstration mode is user friendly and it functions as a tutorial." The Board adopted the examiner's answer, stating "the examiner has provided a well reasoned discussion of these references and how the combination of these references meets the claim limitations." However, perhaps recognizing that the examiner had provided insufficient justification to \*1342 support combining the Nortrup and Thunderchopper references, the Board held, as stated

*supra*, that a "specific hint or suggestion" of motivation to combine was not required.

This appeal followed.

#### *Judicial Review*

[1] Tribunals of the PTO are governed by the Administrative Procedure Act, and their rulings receive the same judicial deference as do tribunals of other administrative agencies. *Dickinson v. Zurko*, 527 U.S. 150, 119 S.Ct. 1816, 144 L.Ed.2d 143, 50 USPQ2d 1930 (1999). Thus on appeal we review a PTO Board's findings and conclusions in accordance with the following criteria:

- 5 U.S.C. § 706(2) The reviewing court shall--  
(2) hold unlawful and set aside agency actions, findings, and conclusions found to be--  
(A) arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law;

\* \* \* \* \*

(E) unsupported by substantial evidence in a case subject to sections 556 and 557 of this title or otherwise reviewed on the record of an agency hearing provided by statute;

[2][3] For judicial review to be meaningfully achieved within these strictures, the agency tribunal must present a full and reasoned explanation of its decision. The agency tribunal must set forth its findings and the grounds thereof, as supported by the agency record, and explain its application of the law to the found facts. The Court has often explained:

The Administrative Procedure Act, which governs the proceedings of administrative agencies and related judicial review, establishes a scheme of "reasoned decisionmaking." Not only must an agency's decreed result be within the scope of its lawful authority, but the process by which it reaches that result must be logical and rational.

*Allentown Mack Sales and Service, Inc. v. National Labor Relations Bd.*, 522 U.S. 359, 374, 118 S.Ct. 818, 139 L.Ed.2d 797 (1998) (citation omitted). This standard requires that the agency not only have reached a sound decision, but have articulated the reasons for that decision. The reviewing court is thus enabled to perform meaningful review within the strictures of the APA, for the court will have a basis on which to determine "whether the decision was based on the relevant factors and whether there has been a clear error of judgment." *Citizens to Preserve Overton Park v. Volpe*, 401 U.S. 402, 416, 91 S.Ct. 814, 28 L.Ed.2d 136 (1971). Judicial review of a Board decision denying an application for patent is

thus founded on the obligation of the agency to make the necessary findings and to provide an administrative record showing the evidence on which the findings are based, accompanied by the agency's reasoning in reaching its conclusions. See *In re Zurko*, 258 F.3d 1379, 1386, 59 USPQ2d 1693, 1697 (Fed.Cir.2001) (review is on the administrative record); *In re Gartside*, 203 F.3d 1305, 1314, 53 USPQ2d 1769, 1774 (Fed.Cir.2000) (Board decision "must be justified within the four corners of the record").

[4][5] As applied to the determination of patentability *vel non* when the issue is obviousness, "it is fundamental that rejections under 35 U.S.C. § 103 must be based on evidence comprehended by the language of that section." *In re Grasselli*, 713 F.2d 731, 739, 218 USPQ 769, 775 (Fed.Cir.1983). The essential factual evidence on the issue of obviousness is set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17-18, 86 S.Ct. 684, 15 L.Ed.2d 545, 148 USPQ 459, 467 (1966) and extensive ensuing precedent. The patent examination \*1343 process centers on prior art and the analysis thereof. When patentability turns on the question of obviousness, the search for and analysis of the prior art includes evidence relevant to the finding of whether there is a teaching, motivation, or suggestion to select and combine the references relied on as evidence of obviousness. See, e.g., *McGinley v. Franklin Sports, Inc.*, 262 F.3d 1339, 1351-52, 60 USPQ2d 1001, 1008 (Fed.Cir.2001) ("the central question is whether there is reason to combine [the] references," a question of fact drawing on the *Graham* factors).

[6] "The factual inquiry whether to combine references must be thorough and searching." *Id.* It must be based on objective evidence of record. This precedent has been reinforced in myriad decisions, and cannot be dispensed with. See, e.g., *Brown & Williamson Tobacco Corp. v. Philip Morris Inc.*, 229 F.3d 1120, 1124-25, 56 USPQ2d 1456, 1459 (Fed.Cir.2000) ("a showing of a suggestion, teaching, or motivation to combine the prior art references is an 'essential component of an obviousness holding' ") (quoting *C.R. Bard, Inc. v. M3 Systems, Inc.*, 157 F.3d 1340, 1352, 48 USPQ2d 1225, 1232 (Fed.Cir.1998)); *In re Dembiczak*, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed.Cir.1999) ("Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references."); *In re Dance*, 160 F.3d 1339, 1343, 48 USPQ2d 1635, 1637

(Fed.Cir.1998) (there must be some motivation, suggestion, or teaching of the desirability of making the specific combination that was made by the applicant); *In re Fine*, 837 F.2d 1071, 1075, 5 USPQ2d 1596, 1600 (Fed.Cir.1988) ("'teachings of references can be combined *only* if there is some suggestion or incentive to do so.'") (emphasis in original) (quoting *ACS Hosp. Sys., Inc. v. Montefiore Hosp.*, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed.Cir.1984)).

The need for specificity pervades this authority. See, e.g., *In re Kotzab*, 217 F.3d 1365, 1371, 55 USPQ2d 1313, 1317 (Fed.Cir.2000) ("particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed"); *In re Rouffet*, 149 F.3d 1350, 1359, 47 USPQ2d 1453, 1459 (Fed.Cir.1998) ("even when the level of skill in the art is high, the Board must identify specifically the principle, known to one of ordinary skill, that suggests the claimed combination. In other words, the Board must explain the reasons one of ordinary skill in the art would have been motivated to select the references and to combine them to render the claimed invention obvious."); *In re Fritch*, 972 F.2d 1260, 1265, 23 USPQ2d 1780, 1783 (Fed.Cir.1992) (the examiner can satisfy the burden of showing obviousness of the combination "only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references").

[7][8][9] With respect to Lee's application, neither the examiner nor the Board adequately supported the selection and combination of the Nortrup and Thunderchopper references to render obvious that which Lee described. The examiner's conclusory statements that "the demonstration mode is just a programmable feature which can be used in many different device[s] for providing automatic introduction by adding the proper programming software" and that "another motivation would be that the automatic demonstration mode is user friendly and it functions as a tutorial" do not adequately address the issue of motivation to combine. This factual question \*1344 of motivation is material to patentability, and could not be resolved on subjective belief and unknown authority. It is improper, in determining whether a person of ordinary skill would have been led to this combination of references, simply to "[use] that which the inventor taught against its teacher." *W.L. Gore v. Garlock, Inc.*, 721

F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed.Cir.1983). Thus the Board must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the agency's conclusion.

[10] Deferential judicial review under the Administrative Procedure Act does not relieve the agency of its obligation to develop an evidentiary basis for its findings. To the contrary, the Administrative Procedure Act reinforces this obligation. See, e.g., *Motor Vehicle Manufacturers Ass'n v. State Farm Mutual Automobile Ins. Co.*, 463 U.S. 29, 43, 103 S.Ct. 2856, 77 L.Ed.2d 443 (1983) ("the agency must examine the relevant data and articulate a satisfactory explanation for its action including a 'rational connection between the facts found and the choice made.'") (quoting *Burlington Truck Lines v. United States*, 371 U.S. 156, 168, 83 S.Ct. 239, 9 L.Ed.2d 207 (1962)); *Securities & Exchange Comm'n v. Chenery Corp.*, 318 U.S. 80, 94, 63 S.Ct. 454, 87 L.Ed. 626 (1943) ("The orderly function of the process of review requires that the grounds upon which the administrative agency acted are clearly disclosed and adequately sustained.").

[11] In its decision on Lee's patent application, the Board rejected the need for "any specific hint or suggestion in a particular reference" to support the combination of the Nortrup and Thunderchopper references. Omission of a relevant factor required by precedent is both legal error and arbitrary agency action. See *Motor Vehicle Manufacturers*, 463 U.S. at 43, 103 S.Ct. 2856 ("an agency rule would be arbitrary and capricious if the agency ... entirely failed to consider an important aspect of the problem"); *Mullins v. Department of Energy*, 50 F.3d 990, 992 (Fed.Cir.1995) ("It is well established that agencies have a duty to provide reviewing courts with a sufficient explanation for their decisions so that those decisions may be judged against the relevant statutory standards, and that failure to provide such an explanation is grounds for striking down the action."). As discussed in *National Labor Relations Bd. v. Ashkenazy Property Mgt. Corp.*, 817 F.2d 74, 75 (9th Cir.1987), an agency is "not free to refuse to follow circuit precedent."

[12] The foundation of the principle of judicial deference to the rulings of agency tribunals is that the tribunal has specialized knowledge and expertise, such that when reasoned findings are made, a reviewing court may confidently defer to the agency's application of its knowledge in its area of expertise.

Reasoned findings are critical to the performance of agency functions and judicial reliance on agency competence. See *Baltimore and Ohio R.R. Co. v. Aberdeen & Rockfish R.R. Co.*, 393 U.S. 87, 91-92, 89 S.Ct. 280, 21 L.Ed.2d 219 (1968) (absent reasoned findings based on substantial evidence effective review would become lost "in the haze of so-called expertise"). The "common knowledge and common sense" on which the Board relied in rejecting Lee's application are not the specialized knowledge and expertise contemplated by the Administrative Procedure Act. Conclusory statements such as those here provided do not fulfill the agency's obligation. This court explained in *Zurko*, 258 F.3d at 1385, 59 USPQ2d at 1697, that "deficiencies of the cited references cannot be remedied by the Board's general conclusions about what is 'basic knowledge' or 'common sense.' " The \*1345 Board's findings must extend to all material facts and must be documented on the record, lest the "haze of so-called expertise" acquire insulation from accountability. "Common knowledge and common sense," even if assumed to derive from the agency's expertise, do not substitute for authority when the law requires authority. See *Allentown Mack*, 522 U.S. at 376, 118 S.Ct. 818 ("Because reasoned decisionmaking demands it, and because the systemic consequences of any other approach are unacceptable, the Board must be required to apply in fact the clearly understood legal standards that it enunciates in principle....")

The case on which the Board relies for its departure from precedent, *In re Bozek*, 57 C.C.P.A. 713, 416 F.2d 1385, 163 USPQ 545 (1969), indeed mentions "common knowledge and common sense," the CCPA stating that the phrase was used by the Solicitor to support the Board's conclusion of obviousness based on evidence in the prior art. *Bozek* did not hold that common knowledge and common sense are a substitute for evidence, but only that they may be applied to analysis of the evidence. *Bozek* did not hold that objective analysis, proper authority, and reasoned findings can be omitted from Board decisions. Nor does *Bozek*, after thirty-two years of isolation, outweigh the dozens of rulings of the Federal Circuit and the Court of Customs and Patent Appeals that determination of patentability must be based on evidence. This court has remarked, in *Smiths Industries Medical Systems, Inc. v. Vital Signs, Inc.*, 183 F.3d 1347, 1356, 51 USPQ2d 1415, 1421 (Fed.Cir.1999), that *Bozek*'s reference to common knowledge "does not in and of itself make it so" absent evidence of such knowledge.

[13][14][15][16] The determination of patentability

on the ground of unobviousness is ultimately one of judgment. In furtherance of the judgmental process, the patent examination procedure serves both to find, and to place on the official record, that which has been considered with respect to patentability. The patent examiner and the Board are deemed to have experience in the field of the invention; however, this experience, insofar as applied to the determination of patentability, must be applied from the viewpoint of "the person having ordinary skill in the art to which said subject matter pertains," the words of section 103. In finding the relevant facts, in assessing the significance of the prior art, and in making the ultimate determination of the issue of obviousness, the examiner and the Board are presumed to act from this viewpoint. Thus when they rely on what they assert to be general knowledge to negate patentability, that knowledge must be articulated and placed on the record. The failure to do so is not consistent with either effective administrative procedure or effective judicial review. The board cannot rely on conclusory statements when dealing with particular combinations of prior art and specific claims, but must set forth the rationale on which it relies.

#### *Alternative Grounds*

At oral argument the PTO Solicitor proposed alternative grounds on which this court might affirm the Board's decision. However, as stated in Burlington Truck Lines, Inc. v. United States, 371 U.S. 156, 168, 83 S.Ct. 239, 9 L.Ed.2d 207 (1962), "courts may not accept appellate counsel's *post hoc* rationalization for agency action." Consideration by the appellate tribunal of new agency justifications deprives the aggrieved party of a fair opportunity to support its position; thus review of an administrative decision must be made on the grounds relied on by the agency. "If those grounds are inadequate or improper, the court is powerless to affirm the administrative action by substituting what it considers \*1346 to be a more adequate or proper basis." Securities & Exchange Comm'n v. Chenery Corp., 332 U.S. 194, 196, 67 S.Ct. 1575, 91 L.Ed. 1995 (1947). As reiterated in Federal Election Comm'n v. Akins, 524 U.S. 11, 25, 118 S.Ct. 1777, 141 L.Ed.2d 10 (1998), "If a reviewing court agrees that the agency misinterpreted the law, it will set aside the agency's action and remand the case--even though the agency (like a new jury after a mistrial) might later, in the exercise of its lawful discretion, reach the same result for a different reason." Thus we decline to consider alternative grounds that might support the Board's decision.

#### *Further Proceedings*

[17] Sound administrative procedure requires that the agency apply the law in accordance with statute and precedent. The agency tribunal must make findings of relevant facts, and present its reasoning in sufficient detail that the court may conduct meaningful review of the agency action. In Radio-Television News Directors Ass'n v. FCC, 184 F.3d 872 (D.C.Cir.1999) the court discussed the "fine line between agency reasoning that is 'so crippled as to be unlawful' and action that is potentially lawful but insufficiently or inappropriately explained," quoting from Checkosky v. Securities & Exch. Comm'n, 23 F.3d 452, 464 (D.C.Cir.1994); the court explained that "[i]n the former circumstance, the court's practice is to vacate the agency's order, while in the latter the court frequently remands for further explanation (including discussion of the relevant factors and precedents) while withholding judgment on the lawfulness of the agency's proposed action." *Id.* at 888. In this case the Board's analysis of the Lee invention does not comport with either the legal requirements for determination of obviousness or with the requirements of the Administrative Procedure Act that the agency tribunal set forth the findings and explanations needed for "reasoned decisionmaking." Remand for these purposes is required. See Overton Park, 401 U.S. at 420-421, 91 S.Ct. 814 (remanding for further proceedings appropriate to the administrative process).

#### *VACATED AND REMANDED.*

277 F.3d 1338, 61 U.S.P.Q.2d 1430

#### **Briefs and Other Related Documents ([Back to top](#))**

- [2000 WL 34252120](#) (Appellate Brief) Reply Brief for Appellant (May. 22, 2000)Original Image of this Document with Appendix (PDF)
- [2000 WL 34252119](#) (Appellate Brief) Brief for Appellee Director of the United States Patent and Trademark Office (May. 08, 2000)Original Image of this Document (PDF)
- [2000 WL 34252118](#) (Appellate Brief) Combined Brief for Appellant and Appendix (Mar. 10, 2000)Original Image of this Document with Appendix (PDF)
- [00-1158](#) (Docket) (Nov. 29, 1999)

277 F.3d 1338  
277 F.3d 1338, 61 U.S.P.Q.2d 1430  
(Cite as: 277 F.3d 1338)

Page 8

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United States Court of Appeals,  
Federal Circuit.  
In re Hans OETIKER.  
No. 91-1026.

Oct. 13, 1992.

Inventor submitted patent application for an improvement in a metal hose clamp which added a preassembly hook. The United States Patent and Trademark Office Board of Patent Appeals and Interferences rejected the application as a prima facie case of obviousness, and inventor appealed. The Court of Appeals, Pauline Newman, Circuit Judge, held that: (1) concept of a prima facie case was applicable to various technologies including those outside field of chemical arts; (2) Board, by explaining that patent examiner's rejection constituted prima facie case of obviousness, did not make a new rejection for appeal purposes; and (3) invention, although simple, did not present prima facie case of obviousness.

Reversed.

Nies, Chief Judge, and Plager, Circuit Judge, concurred with opinions.

#### West Headnotes

##### [1] Patents 32

###### 291k32 Most Cited Cases

The prima facie case is a procedural tool of patent examination, allocating burdens of going forward as between examiner and applicant; the term "prima facie case" refers only to the initial examination step.

##### [2] Patents 32

###### 291k32 Most Cited Cases

Patent examiner bears initial burden, on review of prior art or on any other ground, of presenting prima facie case of unpatentability, and if that burden is met, burden of coming forward with evidence or argument shifts to the applicant; after evidence or argument is submitted by applicant in response, patentability is determined on the totality of the record by preponderance of evidence with due considerations to persuasiveness of argument.

##### [3] Patents 36(2)

##### 291k36(2) Most Cited Cases

If examination at initial stage does not produce prima facie case of unpatentability, then, without more, the applicant is entitled to a grant of the patent.

##### [4] Patents 113(7)

###### 291k113(7) Most Cited Cases

In reviewing the patent examiner's decision on appeal, the United States Patent and Trademark Office Board of Patent Appeals and Interferences (Board) must necessarily weigh all of the evidence and argument; an observation by the Board that the examiner made prima facie case is not improper, as long as ultimate determination of patentability is made on entire record.

##### [5] Patents 113(8)

###### 291k113(8) Most Cited Cases

Patent applicant failed to establish that a holding of prima facie obviousness by the United States Patent and Trademark Office Board of Patent Appeals and Interferences (Board) was a new rejection of application for appeal purposes where application was fully prosecuted, and examiner had issued final rejection; mere use of words "prima facie obviousness" by the examiner, when those words had not been used earlier did not make rejection on such grounds by the Board a new rejection.

##### [6] Patents 32

###### 291k32 Most Cited Cases

Concept of the prima facie case has broad applicability for patent applications; that a prima facie case may be established, or rebutted, by different forms of evidence in various technologies does not restrict the concept to any particular field of technology including those outside field of chemical arts.

##### [7] Patents 16(1)

###### 291k16(1) Most Cited Cases

To rely on a reference to another industry as a basis for rejection of patent applicant's invention, reference must either be in field of applicant's endeavor, or if not, then be reasonably pertinent to particular problem with which inventor was concerned.

##### [8] Patents 16(3)

###### 291k16(3) Most Cited Cases

It is necessary to use common sense in deciding, for purposes of assessing obviousness of invention,

which fields a person of ordinary skill would reasonably be expected to look for solution to the problem facing the inventor who seeks a patent.

### [9] Patents 32

#### 291k32 Most Cited Cases

To present a *prima facie* case of obviousness to reject patent application, it is insufficient to use combination of elements from nonanalogous sources in a manner that reconstructs patent applicant's invention only with the benefit of hindsight; there must be some reason, suggestion, or motivation found in the prior art whereby person of ordinary skill in the field of the invention would make the combination.

### [10] Patents 16.15

#### 291k16.15 Most Cited Cases

Rejection of inventor's hose clamp fastener as presenting *prima facie* case of obviousness was improper where, in making unpatentability determination, United States Patent and Trademark Office Board of Patent Appeals and Interferences had relied on references to garment industry without any showing that person of ordinary skill would reasonably be expected or motivated to look to garment fasteners to solve problem of fastening hose clamp. 35 U.S.C.A. § 103.

\*1444 Paul M. Craig, Jr., Washington, D.C., argued for appellant.

John W. Dewhirst, Office of the Sol., Arlington, Va., argued for appellee. With him on the brief were Fred E. McKelvey, Sol. and Robert D. Edmonds, Associate Sol.

Before NIES, Chief Judge, NEWMAN and PLAGER, Circuit Judges.

PAULINE NEWMAN, Circuit Judge.

Hans Oetiker appeals the decision of the United States Patent and Trademark Office Board of Patent Appeals and Interferences, holding unpatentable claims 1-14 and 16-21, all of the claims in patent application No. 06/942,694. [FN1] Oetiker appeals on procedural and substantive grounds.

FN1. *Ex parte Oetiker*, No. 89-2230 (Bd.Pat.App. & Interf. May 31, 1990; on reconsideration, August 23, 1990).

## I PROCEDURE

### Background

All of the claims were finally rejected for obviousness in terms of 35 U.S.C. § 103. The Board, upholding the rejection, stated that "the examiner has ... established a *prima facie* case of obviousness ... which is unrebutted by any objective evidence of nonobviousness". Oetiker stated that this Board holding was the first rejection of his claims for being "*prima facie* obvious", and filed rebuttal evidence with a petition for reconsideration. The Board declined to consider the new evidence or change its decision.

Oetiker states that a holding of *prima facie* obviousness means, in patent examination, that the claimed invention is subject \*1445 to a rebuttable presumption of obviousness; that is, if the applicant can provide evidence or argument in support of unobviousness, such evidence and argument will be considered, and the question of patentability will be redetermined on the entire record. Oetiker states that a rejection made in the words "*prima facie* obvious" is understood by patent examiners and practitioners as an invitation to provide such rebuttal evidence.

Thus Oetiker argues that a holding by the Board of *prima facie* obviousness is a new ground of rejection, for during prosecution the examiner did not reject the claims in these words. Treating it as such, Oetiker offered affidavit evidence not previously filed, and requested reconsideration on the basis of this new evidence, or remand to the examiner for this purpose, in accordance with 37 C.F.R. § 1.196(b):

§ 1.196(b) ... When the Board ... makes a new rejection of an appealed claim, the appellant may exercise either of the following two options ...:

(1) The appellant may submit ... a showing of facts ... and have the matter reconsidered by the examiner in which event the application will be remanded to the examiner....

(2) The appellant may have the case reconsidered under § 1.197(b) by the Board ... upon the same record.

The Board on reconsideration granted neither of the options of § 1.196(b), stating that it had not made a new rejection.

At argument before this court the Commissioner's counsel suggested that Oetiker could refile his patent application, pay a new fee, and obtain review of this new evidence in a new examination. Oetiker states that he was entitled to a complete examination, and did not get it.

### Discussion

[1][2] The *prima facie* case is a procedural tool of patent examination, allocating the burdens of going forward as between examiner and applicant. *In re Spada*, 911 F.2d 705, 707 n. 3, 15 USPQ2d 1655, 1657 n. 3 (Fed.Cir.1990). The term "prima facie case" refers only to the initial examination step. *In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed.Cir.1984); *In re Rinehart*, 531 F.2d 1048, 1052, 189 USPQ 143, 147 (CCPA 1976). As discussed in *In re Piasecki*, the examiner bears the initial burden, on review of the prior art or on any other ground, of presenting a *prima facie* case of unpatentability. If that burden is met, the burden of coming forward with evidence or argument shifts to the applicant.

After evidence or argument is submitted by the applicant in response, patentability is determined on the totality of the record, by a preponderance of evidence with due consideration to persuasiveness of argument. See *In re Spada*, *supra*; *In re Corkill*, 771 F.2d 1496, 1500, 226 USPQ 1005, 1008 (Fed.Cir.1985); *In re Caveney*, 761 F.2d 671, 674, 226 USPQ 1, 3 (Fed.Cir.1985); *In re Johnson*, 747 F.2d 1456, 1460, 223 USPQ 1260, 1263 (Fed.Cir.1984).

[3] If examination at the initial stage does not produce a *prima facie* case of unpatentability, then without more the applicant is entitled to grant of the patent. See *In re Grabiak*, 769 F.2d 729, 733, 226 USPQ 870, 873 (Fed.Cir.1985); *In re Rinehart*, *supra*.

[4] In reviewing the examiner's decision on appeal, the Board must necessarily weigh all of the evidence and argument. An observation by the Board that the examiner made a *prima facie* case is not improper, as long as the ultimate determination of patentability is made on the entire record. *In re Piasecki*, 745 F.2d at 1472, 223 USPQ at 788; *In re Rinehart*, 531 F.2d at 1052, 189 USPQ at 147.

[5] The record here reveals that the application was fully prosecuted. References were cited and applied by the examiner, the applicant responded with argument, and the examiner then issued a final rejection, stating why he was not persuaded by the applicant's argument. On review the Board stated that its decision was reached "after careful consideration of the appealed claims, the evidence of obviousness relied upon by the examiner and the arguments advanced by the appellant and the examiner". The Board explained why it was unpersuaded \*1446 by Oetiker's arguments on appeal. We discern no irregularity in the procedure.

The Board, in explaining that the examiner's rejections constituted a *prima facie* case of obviousness, did not make a new rejection.

[6] Oetiker also argues that the concept of a "*prima facie* case of obviousness" has no role outside of the chemical arts. Oetiker refers to the origins of this term in the chemical practice, where properties may not be apparent from chemical structure. Oetiker distinguishes mechanical inventions, where the properties and workings of a mechanical device are apparent in the drawing of the structure. We think that the PTO is correct in treating the concept of the *prima facie* case as of broad applicability, for it places the initial burden on the examiner, the appropriate procedure whatever the technological class of invention. That a *prima facie* case may be established, or rebutted, by different forms of evidence in various technologies does not restrict the concept to any particular field of technology. "[T]he requirement of unobviousness in the case of chemical inventions is the same as for other types of inventions". *In re Johnson*, 747 F.2d at 1460, 223 USPQ at 1263. This procedural tool is recognized in fields outside of the chemical arts. E.g., *In re Benno*, 768 F.2d 1340, 226 USPQ 683 (Fed.Cir.1985); *In re McCarthy*, 763 F.2d 411, 226 USPQ 99 (Fed.Cir.1985); *In re De Blauwe*, 736 F.2d 699, 222 USPQ 191 (Fed.Cir.1984).

The Board's usage of the term *prima facie* was imprecise for, as discussed *supra*, the term "*prima facie* obvious" relates to the burden on the examiner at the initial stage of the examination, while the conclusion of obviousness *vel non* is based on the preponderance of evidence and argument in the record. However, it was clear that the Board did not make a new rejection. Therefore the Board did not err in declining to consider at that stage the proffered evidence of commercial success.

## II THE MERITS

Oetiker's invention is an improvement in a "stepless, earless" metal clamp, a hose clamp that was generally described in an earlier '004 patent of Oetiker, but that differs in the presence of a feature that is described as a preassembly "hook". This "hook" serves both to maintain the preassembly condition of the clamp and to be disengaged automatically when the clamp is tightened.

The cited references were Oetiker's earlier-granted '004 patent, combined with a certain Lauro '004 patent. Lauro describes a plastic hook and eye

fastener for use in garments, in which "unitary tabs of sewing needle puncturable plastic material ... are affixable to clothing and the like by sewing". Oetiker argues that there is no suggestion or motivation to the artisan to combine the teachings of the cited references, and that Lauro is nonanalogous art. Oetiker concludes that these references were improperly combined; that a person of ordinary skill, seeking to solve the problem facing Oetiker, would not look to the garment art for the solution. Oetiker also argues that even if combined the references do not render the claimed combination obvious.

The examiner stated that "since garments commonly use hooks for securement", a person faced with the problem of unreliable maintenance of the pre-assembly configuration of an assembly line metal hose clamp would look to the garment industry art. The examiner explained further by stating that "Appellant's device as disclosed could be utilized as part of a garment". The Board did not repeat or support the examiner's argument, or discuss its relevance. Indeed, the argument is not supportable. However, the Board held that the Lauro reference, although not "within the appellant's specific field of endeavor" is nonetheless "analogous art" because it relates to a hooking problem, as does Oetiker's invention.

The Board apparently reasoned that all hooking problems are analogous. At least, that is the argument now pressed by the Commissioner. The Commissioner states in his brief on appeal that "A disengageable \*1447 catch, such as that used by Oetiker, is a common everyday mechanical concept that is variously employed in door latches and electrical and other switches, as well as in the hook and eye apparatus disclosed by Lauro". No such references were cited, however. While this court may take judicial notice of common everyday mechanical concepts in appropriate circumstances, the Commissioner did not explain why a "catch" of unstated structure in an electrical switch, for example, is such a concept and would have made Oetiker's invention obvious. Indeed, the Commissioner did not respond to Oetiker's argument that the cited references provide no teaching or suggestion that Lauro's molded hook and eye fastener, even if combined with Oetiker's '004 clamp, would achieve Oetiker's purpose.

[7][8] In order to rely on a reference as a basis for rejection of the applicant's invention, the reference must either be in the field of the applicant's endeavor or, if not, then be reasonably pertinent to the

particular problem with which the inventor was concerned. See *In re Deminski*, 796 F.2d 436, 442, 230 USPQ 313, 315 (Fed.Cir.1986). Patent examination is necessarily conducted by hindsight, with complete knowledge of the applicant's invention, and the courts have recognized the subjective aspects of determining whether an inventor would reasonably be motivated to go to the field in which the examiner found the reference, in order to solve the problem confronting the inventor. We have reminded ourselves and the PTO that it is necessary to consider "the reality of the circumstances", *In re Wood*, 599 F.2d 1032, 1036, 202 USPQ 171, 174 (CCPA 1979)--in other words, common sense--in deciding in which fields a person of ordinary skill would reasonably be expected to look for a solution to the problem facing the inventor.

[9][10] It has not been shown that a person of ordinary skill, seeking to solve a problem of fastening a hose clamp, would reasonably be expected or motivated to look to fasteners for garments. The combination of elements from non-analogous sources, in a manner that reconstructs the applicant's invention only with the benefit of hindsight, is insufficient to present a *prima facie* case of obviousness. There must be some reason, suggestion, or motivation found in the prior art whereby a person of ordinary skill in the field of the invention would make the combination. That knowledge can not come from the applicant's invention itself. *Diversitech Corp. v. Century Steps, Inc.*, 850 F.2d 675, 678-79, 7 USPQ2d 1315, 1318 (Fed.Cir.1988); *In re Geiger*, 815 F.2d 686, 687, 2 USPQ2d 1276, 1278 (Fed.Cir.1987); *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1147, 227 USPQ 543, 551 (Fed.Cir.1985).

Oetiker's invention is simple. Simplicity is not inimical to patentability. See *Goodyear Tire & Rubber Co. v. Ray-O-Vac Co.*, 321 U.S. 275, 279, 64 S.Ct. 593, 594, 88 L.Ed. 721 (1944) (simplicity of itself does not negate invention); *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1572, 1 USPQ2d 1593, 1600 (Fed.Cir.) (the patent system is not foreclosed to those who make simple inventions), cert. denied, 481 U.S. 1052, 107 S.Ct. 2187, 95 L.Ed.2d 843 (1987).

We conclude that the references on which the Board relied were improperly combined. Accordingly, the Board erred in holding the claims unpatentable under section 103. The rejection of claims 1-4 and 16-21 is

REVERSED.

NIES, Chief Judge, concurring.

I agree with the panel decision and write only to express my understanding of the language that there must be some teaching, reason, suggestion, or motivation found "in the prior art" or "in the prior art references" to make a combination to render an invention obvious within the meaning of 35 U.S.C. § 103 (1988). Similar language appears in a number of opinions [FN1] \*1448 and if taken literally would mean that an invention cannot be held to have been obvious unless something specific in a prior art reference would lead an inventor to combine the teachings therein with another piece of prior art.

FN1. See, e.g., Symbol Technologies, Inc. v. Opticon, Inc., 935 F.2d 1569, 1576, 19 USPQ2d 1241, 1246 (Fed.Cir.1991); In re Gorman, 933 F.2d 982, 986, 18 USPQ2d 1885, 1888 (Fed.Cir.1991); In re Mills, 916 F.2d 680, 682, 16 USPQ2d 1430, 1432 (Fed.Cir.1990); Smithkline Diagnostics, Inc. v. Helena Laboratories Corp., 859 F.2d 878, 887, 8 USPQ2d 1468, 1475 (Fed.Cir.1988); In re Dow Chemical Co., 837 F.2d 469, 473, 5 USPQ2d 1529, 1531 (Fed.Cir.1988); In re Stencel, 828 F.2d 751, 755, 4 USPQ2d 1071, 1073 (Fed.Cir.1987); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 293, 227 USPQ 657, 664 (Fed.Cir.1985), cert. denied, 475 U.S. 1017, 106 S.Ct. 1201, 89 L.Ed.2d 315 (1986); In re Grabiak, 769 F.2d 729, 732, 226 USPQ 870, 872 (Fed.Cir.1985).

This restrictive understanding of the concept of obviousness is clearly wrong. Other statements in opinions express the idea more generally. We have stated, for example, that the test is: "whether the teachings of the prior art, taken as a whole, would have made obvious the claimed invention," In re Gorman, 933 F.2d at 986, 18 USPQ2d at 1888, and "what the combined teachings ... would have suggested to one of ordinary skill in the art," In re Young, 927 F.2d 588, 591, 18 USPQ2d 1089, 1091 (Fed.Cir.1991). We have also stated that "the prior art as a whole must suggest the desirability ... of making the combination." Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed.Cir.), cert. denied, 488 U.S. 825, 109 S.Ct. 75, 102 L.Ed.2d 51 (1988); Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co., 730 F.2d 1452, 1462, 221 USPQ 481,

488 (Fed.Cir.1984).

I believe that it would better reflect the concept of obviousness to speak in terms of "*from* the prior art" rather than simply "*in* the prior art." The word "from" expresses the idea of the statute that we must look at the obviousness issue through the eyes of one of ordinary skill in the art and what one would be presumed to know with that background. What would be obvious to one of skill in the art is a different question from what would be obvious to a layman. An artisan is likely to extract more than a layman from reading a reference.

In any event, variance in the language used in opinions does not change the nature of the statutory inquiry. Under section 103, subject matter is unpatentable if it "would have been obvious ... to a person having ordinary skill in the art." While there must be some teaching, reason, suggestion, or motivation to combine existing elements to produce the claimed device, it is not necessary that the cited references or prior art specifically suggest making the combination. In re Nilssen, 851 F.2d 1401, 1403, 7 USPQ2d 1500, 1502 (Fed.Cir.1988). Such suggestion or motivation to combine prior art teachings can derive solely from the existence of a teaching, which one of ordinary skill in the art would be presumed to know, and the use of that teaching to solve the same or similar problem which it addresses. In re Wood, 599 F.2d 1032, 1037, 202 USPQ 171, 174 (CCPA 1979). See, also, EWP Corp. v. Reliance Universal, Inc., 755 F.2d 898, 906-07, 225 USPQ 20, 25 (Fed.Cir.), cert. denied, 474 U.S. 843, 106 S.Ct. 131, 88 L.Ed.2d 108 (1985); In re Sernaker, 702 F.2d 989, 995, 217 USPQ 1, 6 (Fed.Cir.1983). See also, Ex parte Clapp, 227 USPQ 972, 973 (Bd.Pat.App. & Inter. 1985) ("To support the conclusion that the claimed combination is directed to obvious subject matter, either the references must expressly or implicitly suggest the claimed combination or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.").

In sum, it is off the mark for litigants to argue, as many do, that an invention cannot be held to have been obvious unless a suggestion to combine prior art teachings is found *in* a specific reference.

PLAGER, Circuit Judge, concurring.

I join in the carefully-reasoned and well-written opinion of Judge Newman. With regard to Part I

dealing with the PTO procedure, her explanation of the meaning and application of the 'prima facie case' concept should help clarify an area that remains marked by a lack of clarity. The \*1449 need for that discussion, however, illustrates the pitfalls of the 'prima facie' practice of the PTO, and the difficulties created by this particular legalistically convoluted concept.

An applicant for a patent is entitled to the patent unless the application fails to meet the requirements established by law. It is the Commissioner's duty (acting through the examining officials) to determine that all requirements of the Patent Act are met. The burden is on the Commissioner to establish that the applicant is not entitled under the law to a patent. In re Warner, 379 F.2d 1011, 1016, 154 USPQ 173, 177 (CCPA 1967), cert. denied 389 U.S. 1057, 88 S.Ct. 811, 19 L.Ed.2d 857 (1968). In rejecting an application, factual determinations by the PTO must be based on a preponderance of the evidence, and legal conclusions must be correct. In re Caveney, 761 F.2d 671, 674, 226 USPQ 1, 3 (Fed.Cir.1985).

The process of patent examination is an interactive one. See generally, Chisum, *Patents*, § 11.03 *et seq.* (1992). The examiner cannot sit mum, leaving the applicant to shoot arrows into the dark hoping to somehow hit a secret objection harbored by the examiner. The 'prima facie case' notion, the exact origin of which appears obscure (see In re Piasecki, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed.Cir.1984)), seemingly was intended to leave no doubt among examiners that they must state clearly and specifically any objections (the prima facie case) to patentability, and give the applicant fair opportunity to meet those objections with evidence and argument. To that extent the concept serves to level the playing field and reduces the likelihood of administrative arbitrariness.

But the ultimate decision that must be made by the PTO in the examination process, and by this court on appeal, is not whether a prima facie case for rejection was made; the only question is whether, on the whole record, the applicant has met the statutory requirements for obtaining a patent. When a final rejection is described in terms of whether a prima facie case was made, that intermediate issue diverts attention from what should be the question to be decided.

Specifically, when obviousness is at issue, the examiner has the burden of persuasion and therefore the initial burden of production. Satisfying the

burden of production, and thus initially the burden of persuasion, constitutes the so-called prima facie showing. Once that burden is met, the applicant has the burden of production to demonstrate that the examiner's preliminary determination is not correct. The examiner, and if later involved, the Board, retain the ultimate burden of persuasion on the issue.

If, as a matter of law, the issue is in equipoise, the applicant is entitled to the patent. Thus on appeal to this court as in the PTO, the applicant does not bear the ultimate burden of persuasion on the issue. In the end there is no reason there or here to argue over whether a 'prima facie' case was made out. The only determinative issue is whether the record as a whole supports the legal conclusion that the invention would have been obvious.

977 F.2d 1443, 24 U.S.P.Q.2d 1443

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**Briefs and Other Related Documents**United States Court of Appeals,  
Federal Circuit.In re Denis ROUFFET, Yannick Tanguy and  
Frederic Berthault.  
**No. 97-1492.**

July 15, 1998.

Applicants sought patent for invention claiming satellite technology to reduce number of necessary "handovers" between beams transmitted by single satellite. The Board of Patent Appeals and Interferences rejected application as obvious, and applicants appealed. The Court of Appeals, Rader, Circuit Judge, held that neither combination of two prior art patents and conference report nor combination of two other prior art patents rendered invention obvious, absent motivation to combine those references.

Reversed.

West Headnotes

**[1] Patents ↗112.3(2)**  
291k112.3(2) Most Cited Cases

To reject claims in patent application as obvious, an examiner must show unrebutted prima facie case of obviousness; in absence of proper prima facie case, applicant who complies with the other statutory requirements is entitled to a patent. 35 U.S.C.A. § 103.

**[2] Patents ↗113(6)**  
291k113(6) Most Cited Cases

On appeal to Board of Patent Appeals and Interferences, patent applicant can overcome a rejection on grounds of obviousness by showing insufficient evidence of prima facie obviousness or by rebutting prima facie case with evidence of secondary indicia of nonobviousness. 35 U.S.C.A. § 103.

**[3] Patents ↗113(6)**  
291k113(6) Most Cited Cases  
While Court of Appeals reviews determination of

obviousness by Board of Patent Appeals and Interferences in light of entire record, patent applicant may specifically challenge an obviousness rejection by showing that Board reached an incorrect conclusion of obviousness or that Board based its obviousness determination on incorrect factual predicates.

**[4] Patents ↗113(6)**  
291k113(6) Most Cited Cases

Court of Appeals reviews ultimate determination of obviousness by Board of Patent Appeals and Interferences as a question of law.

**[5] Patents ↗16(2)**  
291k16(2) Most Cited Cases

**[5] Patents ↗16.5(1)**  
291k16.5(1) Most Cited Cases  
The factual predicates underlying an obviousness determination include the scope and content of the prior art, the differences between the prior art and the claimed invention, and the level of ordinary skill in the art. 35 U.S.C.A. § 103.

**[6] Patents ↗113(6)**  
291k113(6) Most Cited Cases

Court of Appeals reviews factual findings of Board of Patent Appeals and Interferences for clear error, and finding is clearly erroneous when, although there is evidence to support it, the reviewing court on the entire evidence is left with the definite and firm conviction that a mistake has been committed.

**[7] Patents ↗36.1(2)**  
291k36.1(2) Most Cited Cases**[7] Patents ↗36.1(3)**  
291k36.1(3) Most Cited Cases**[7] Patents ↗36.1(4)**  
291k36.1(4) Most Cited Cases**[7] Patents ↗36.2(1)**  
291k36.2(1) Most Cited Cases

Objective evidence of invention's nonobviousness includes copying, long felt but unsolved need, failure of others, commercial success, unexpected results created by the claimed invention, unexpected properties of the claimed invention, licenses showing

industry respect for the invention, and skepticism of skilled artisans before the invention. 35 U.S.C.A. § 103.

[8] Patents ~~Key~~ 97

291k97 Most Cited Cases

Board of Patent Appeals and Interferences must consider all of patent applicant's evidence in determining whether claimed invention is obvious. 35 U.S.C.A. § 103.

[9] Patents ~~Key~~ 314(5)

291k314(5) Most Cited Cases

Whether the evidence presented suffices to rebut the prima facie case of obviousness is part of the ultimate conclusion of obviousness and is therefore a question of law. 35 U.S.C.A. § 103.

[10] Patents ~~Key~~ 16.5(1)

291k16.5(1) Most Cited Cases

When rejection of patent application for obviousness depends on a combination of prior art references, there must be some teaching, suggestion, or motivation to combine the references. 35 U.S.C.A. § 103.

[11] Patents ~~Key~~ 26(1)

291k26(1) Most Cited Cases

When determining the patentability of a claimed invention which combines two known elements, the question in determining issue of obviousness is whether there is something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination. 35 U.S.C.A. § 103.

[12] Patents ~~Key~~ 26(1)

291k26(1) Most Cited Cases

Combination of two prior art patents and conference report did not render obvious invention claiming satellite technology to reduce number of necessary "handovers" between beams transmitted by single satellite, even if combination of references contained all elements claimed in patent application, absent any evidence of motivation to combine such references other than high level of skill in the relevant art. 35 U.S.C.A. § 103.

[13] Patents ~~Key~~ 16(3)

291k16(3) Most Cited Cases

Obviousness is determined from vantage point of a hypothetical person having ordinary skill in the art to which the patent pertains, which is construct akin to "reasonable person" used as reference in negligence determinations and presumes that all prior art

references in the field of the invention are available to hypothetical skilled artisan. 35 U.S.C.A. § 103(a).

[14] Patents ~~Key~~ 26(1)

291k26(1) Most Cited Cases

Combination of prior art patents relating to cellular communications systems did not render obvious invention claiming satellite technology to reduce number of necessary "handovers" between beams transmitted by single satellite, absent identification of specific principle providing motivation to combine those prior art references. 35 U.S.C.A. § 103.

Patents ~~Key~~ 328(2)

291k328(2) Most Cited Cases

4,872,015, 5,170,485, 5,199,672, 5,394,561. Cited as prior art.

\*1352 Richard C. Turner and Grant K. Rowan, Sughrue, Mion, Zinn, Macpeak & Seas, PLLC, Washington, DC, argued for appellants.

David J. Ball, Jr., Associate Solicitor, Office of the Solicitor, Patent and Trademark Office, Arlington, Virginia, argued for appellee. With him on the brief were Nancy J. Linck, Solicitor, Albin F. Drost, Deputy Solicitor, and Craig R. Kaufman, Associate Solicitor. Of counsel was Scott A. Chambers, Associate Solicitor, Office of the Solicitor.

Before PLAGER, Circuit Judge, ARCHER, Senior Circuit Judge, and RADER, Circuit Judge.

RADER, Circuit Judge.

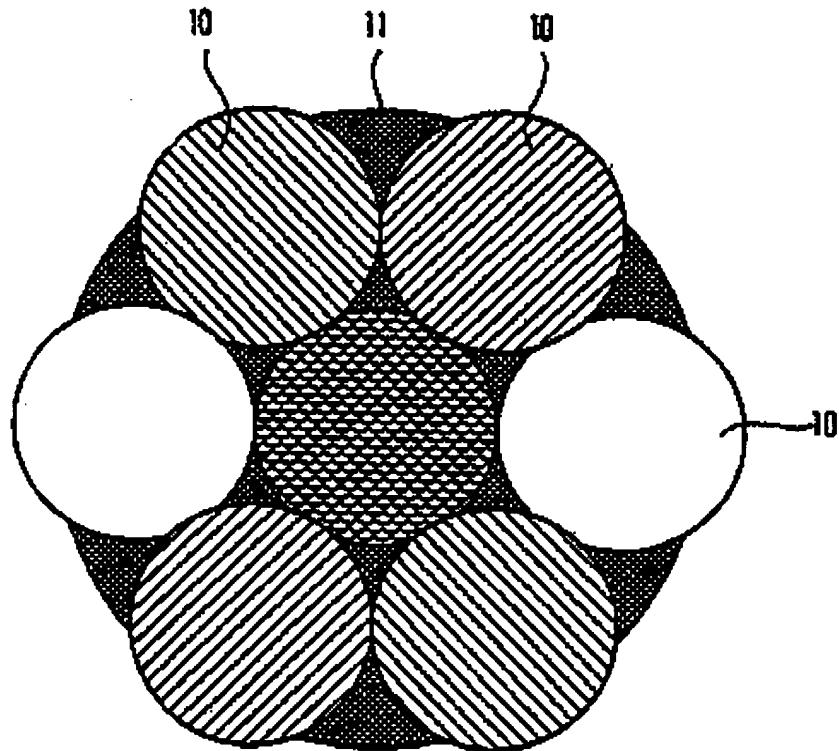
Denis Rouffet, Yannick Tanguy, and Frédéric Bethault (collectively, Rouffet) submitted application 07/888,791 (the application) on May 27, 1992. The Board of Patent Appeals and Interferences (the Board) affirmed final rejection of the application as obvious under 35 U.S.C. § 103(a). See *Ex parte Rouffet*, No. 96-1553 (Bd. Pat.App. & Int. Apr. 16, 1997). Because the Board reversibly erred in identifying a motivation to combine the references, this court reverses.

I.

Satellites in a geosynchronous or geostationary orbit remain over the same point on the Earth's surface. Their constant position above the Earth's surface facilitates communications. These satellites project a number of beams to the Earth. Each beam transmits to its area of coverage, or footprint, on the Earth's surface. In order to provide complete coverage, adjacent footprints overlap slightly and

therefore must use different frequencies to avoid interference. However, two or more non-overlapping footprints can use the same set of frequencies in order to use efficiently the limited radio spectrum. Figure 1 from the application shows

**FIG. 1**



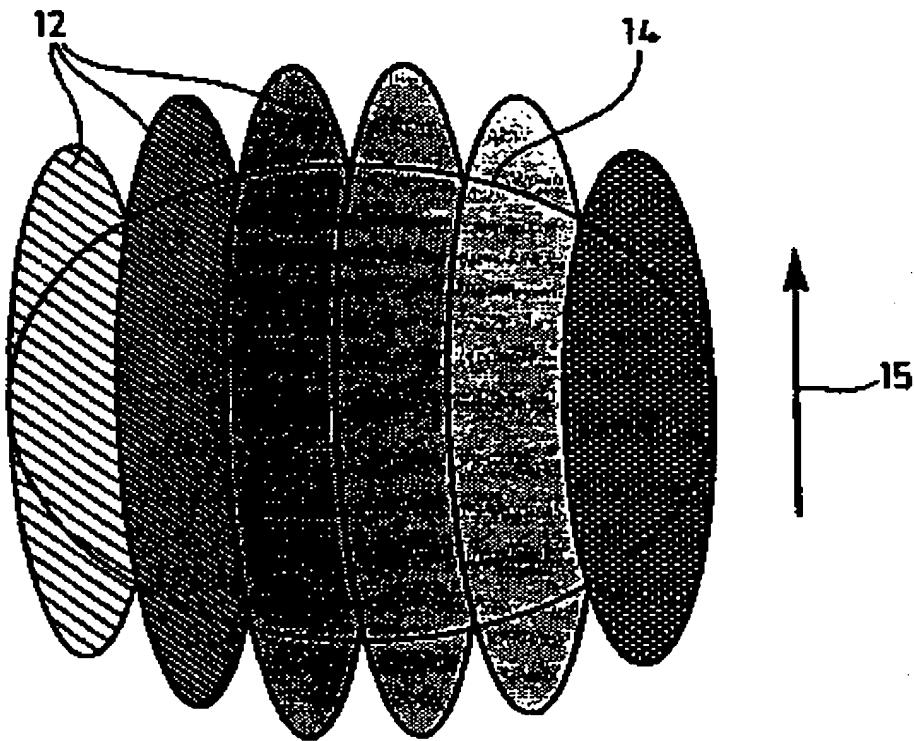
the coverage of a portion of the Earth's surface provided by multiple cone shaped beams:

\*1353 FIG. 1

Frequency reuse techniques, however, have a limited ability to compensate for congestion in geostationary orbits. To alleviate the orbit congestion problem, new telecommunications systems use a network of satellites in low Earth orbit. When viewed from a fixed point on the Earth's surface, such satellites do not remain stationary but move overhead. A satellite's motion as it transmits a plurality of cone-shaped beams creates a new problem. The satellite's movement causes a receiver on the Earth's surface to move from the footprint of one beam into a second beam transmitted by the same satellite. Eventually, the satellite's motion causes the receiver to move from the footprint of a beam transmitted by one satellite into the footprint of a beam transmitted by a second satellite. Each switch from one footprint to another creates a "handover" event analogous to that which occurs when a traditional cellular phone travels from one cell to another. Handovers are undesirable because they can cause interruptions in signal transmission and reception.

Rouffet's application discloses technology to reduce the number of handovers between beams transmitted by the same satellite. In particular, Rouffet eliminates handovers caused solely by the satellite's motion. To accomplish this goal, Rouffet changes the shape of the beam transmitted by the satellite's antenna. Rouffet's satellites transmit fan-shaped beams. A fan beam has an elliptical footprint. Rouffet aligns the long axis of his beams parallel to the direction of the satellite's motion across the Earth's surface. By elongating the beam's footprint in the direction of satellite travel, Rouffet's invention ensures that a fixed point on the Earth's surface likely will remain within a single footprint until it is necessary to switch to another satellite. Because Rouffet's invention does not address handovers caused by the motion of the receiver across the Earth's \*1354 surface, his arrangement reduces, but does not eliminate, handovers. Figure 3 from the application shows the footprints 12 from six beams aligned in the direction of satellite motion 15:

### FIG. 3



The application contains ten claims that stand or fall as a group. Claim 1 is representative:

A low orbit satellite communications system for mobile terminals, wherein the communications antenna system of each satellite provides isoflux coverage made up of a plurality of fan beams that are elongate in the travel direction of the satellite.

The examiner initially rejected Rouffet's claims as unpatentable over U.S. Pat. No. 5,199,672 (King) in view of U.S. Pat. No. 4,872,015 (Rosen) and a conference report entitled "A Novel Non-Geostationary Satellite Communications System," *Conference Record*, International Conference on Communications, 1981 (Ruddy). On appeal to the Board, the examiner added an alternative ground for rejection, holding that the claims were obvious over U.S. Pat. No. 5,394,561 (Freeburg) in view of U.S. Pat. No. 5,170,485 (Levine).

On April 16, 1997, the Board issued its decision. Because Rouffet had specified that the claims would stand or fall as a group based on the patentability of claim 1, the Board limited its opinion to that claim. The Board unanimously determined that the examiner had properly rejected claim 1 as obvious

over King in view of Rosen and Ruddy. The Board, on a split vote, also affirmed the rejection over Freeburg in view of Levine.

#### \*1355 II

[1][2] To reject claims in an application under section 103, an examiner must show an unrebutted *prima facie* case of obviousness. See *In re Deuel*, 51 F.3d 1552, 1557, 34 U.S.P.Q.2d 1210, 1214 (Fed.Cir.1995). In the absence of a proper *prima facie* case of obviousness, an applicant who complies with the other statutory requirements is entitled to a patent. See *In re Oetiker*, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed.Cir.1992). On appeal to the Board, an applicant can overcome a rejection by showing insufficient evidence of *prima facie* obviousness or by rebutting the *prima facie* case with evidence of secondary indicia of nonobviousness. See *id.*

[3][4][5][6] While this court reviews the Board's determination in light of the entire record, an applicant may specifically challenge an obviousness rejection by showing that the Board reached an incorrect conclusion of obviousness or that the Board based its obviousness determination on incorrect factual predicates. This court reviews the ultimate

149 F.3d 1350  
 149 F.3d 1350, 47 U.S.P.Q.2d 1453  
 (Cite as: 149 F.3d 1350)

determination of obviousness as a question of law. See *In re Lueders*, 111 F.3d 1569, 1571, 42 U.S.P.Q.2d 1481, 1482 (Fed.Cir.1997). The factual predicates underlying an obviousness determination include the scope and content of the prior art, the differences between the prior art and the claimed invention, and the level of ordinary skill in the art. See *Monarch Knitting Mach. Corp. v. Sulzer Morat GmbH*, 139 F.3d 877, 881, 45 U.S.P.Q.2d 1977, 1981 (Fed.Cir.1998). This court reviews the Board's factual findings for clear error. See *In re Zurko*, 142 F.3d, 1447, 1449, 46 U.S.P.Q.2d 1691, 1693 (Fed.Cir.1998) (in banc); *Lueders*, 111 F.3d at 1571-72. "A finding is clearly erroneous when, although there is evidence to support it, the reviewing court on the entire evidence is left with the definite and firm conviction that a mistake has been committed." *In re Graves*, 69 F.3d 1147, 1151, 36 U.S.P.Q.2d 1697, 1700 (Fed.Cir.1995) (quoting *United States v. United States Gypsum Co.*, 333 U.S. 364, 395, 68 S.Ct. 525, 92 L.Ed. 746 (1948)).

[7][8][9] The secondary considerations are also essential components of the obviousness determination. See *In re Emert*, 124 F.3d 1458, 1462, 44 U.S.P.Q.2d 1149, 1153 (Fed.Cir.1997) ("Without Emert providing rebuttal evidence, this *prima facie* case of obviousness must stand."). This objective evidence of nonobviousness includes copying, long felt but unsolved need, failure of others, see *Graham v. John Deere Co.*, 383 U.S. 1, 17-18, 86 S.Ct. 684, 15 L.Ed.2d 545 (1966), commercial success, see *In re Huang*, 100 F.3d 135, 139-40, 40 U.S.P.Q.2d 1685, 1689-90 (Fed.Cir.1996), unexpected results created by the claimed invention, unexpected properties of the claimed invention, see *In re Mayne*, 104 F.3d 1339, 1342, 41 U.S.P.Q.2d 1451, 1454 (Fed.Cir.1997); *In re Woodruff*, 919 F.2d 1575, 1578, 16 U.S.P.Q.2d 1934, 1936-37 (Fed.Cir.1990), licenses showing industry respect for the invention, see *Arkie Lures, Inc. v. Gene Larew Tackle, Inc.*, 119 F.3d 953, 957, 43 U.S.P.Q.2d 1294, 1297 (Fed.Cir.1997); *Pentec, Inc. v. Graphic Controls Corp.*, 776 F.2d 309, 316, 227 U.S.P.Q. 766, 771 (Fed.Cir.1985), and skepticism of skilled artisans before the invention, see *In re Dow Chem. Co.*, 837 F.2d 469, 473, 5 U.S.P.Q.2d 1529, 1532 (Fed.Cir.1988). The Board must consider all of the applicant's evidence. See *Oetiker*, 977 F.2d at 1445 ("An observation by the Board that the examiner made a *prima facie* case is not improper, as long as the ultimate determination of patentability is made on the entire record."); *In re Piasecki*, 745 F.2d 1468, 1472, 223 U.S.P.Q. 785, 788 (Fed.Cir.1984). The court reviews factual

conclusions drawn from this evidence for clear error. Whether the evidence presented suffices to rebut the *prima facie* case is part of the ultimate conclusion of obviousness and is therefore a question of law.

[10][11] When a rejection depends on a combination of prior art references, there must be some teaching, suggestion, or motivation to combine the references. See *In re Geiger*, 815 F.2d 686, 688, 2 U.S.P.Q.2d 1276, 1278 (Fed.Cir.1987). Although the suggestion to combine references may flow from the nature of the problem, see *Pro-Mold & Tool Co. v. Great Lakes Plastics, Inc.*, 75 F.3d 1568, 1573, 37 U.S.P.Q.2d 1626, 1630 (Fed.Cir.1996), the suggestion more often comes from the teachings of the pertinent references, see *In re Sernaker*, 702 F.2d 989, 994, 217 U.S.P.Q. 1, 5 (Fed.Cir.1983), or from the ordinary knowledge of those skilled in the art that certain references are of special importance \*1356 in a particular field, see *Pro-Mold*, 75 F.3d at 1573 (citing *Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.*, 776 F.2d 281, 297 n. 24, 227 U.S.P.Q. 657, 667 n. 24 (Fed.Cir.1985)). Therefore, "[w]hen determining the patentability of a claimed invention which combines two known elements, 'the question is whether there is something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination.'" See *In re Beattie*, 974 F.2d 1309, 1311-12, 24 U.S.P.Q.2d 1040, 1042 (Fed.Cir.1992) (quoting *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1462, 221 U.S.P.Q. 481, 488 (Fed.Cir.1984)).

### III

The parties agree that the five references asserted by the examiner are in the same field of endeavor as the invention. The parties also agree that the pertinent level of skill in the art--design of satellite communications systems--is high. On appeal, Rouffet asserts that the examiner and the Board erred by improperly combining references to render the claimed invention obvious.

#### *The Combination of King, Rosen, and Ruddy*

[12] The Board first affirmed the rejection of Rouffet's claims over a combination of King, Rosen, and Ruddy. King discloses a system for launching a plurality of satellites into low Earth orbits from a single launch vehicle. Rosen teaches a geostationary satellite that uses a plurality of fan beams with their long axes oriented in an east-west direction to communicate with mobile and fixed terminals on the Earth.

The final, and most important, reference in this combination is Ruddy. Ruddy describes a television broadcast system that uses a series of satellites to retransmit signals sent from a ground station over a wide area. Rather than using a geostationary orbit, Ruddy teaches the use of a series of satellites in Molniya orbits. A satellite in a Molniya orbit always follows the same path through the sky when viewed from a fixed point on the ground. Viewed from the Earth, the orbital path includes a narrow, elliptical apogee loop. In order to transmit to these moving satellites from a ground station, Ruddy uses a fan beam with a long axis aligned with the long axis of the orbit's apogee loop. This alignment places the entire apogee loop within the footprint of the beam and eliminates the need for the ground station's antenna to track the satellite's motion around the apogee loop. Ruddy further teaches orbit parameters and spacing of multiple satellites to ensure that a satellite is always in the loop to receive and rebroadcast signals from the Earth station.

King and Rosen together teach the use of a network of satellites in low Earth orbit. Thus, Ruddy becomes the piece of the prior art mosaic that shows, in the reading of the Board, the use of "a plurality of fan beams that are elongate in the travel direction of the satellite." Ruddy, however, is different from the claimed invention in several respects. Specifically, the application claims the projection of multiple elliptical fan-shaped footprints from the satellite to the ground. *See Claim 1, supra, see also Application at 6, lines 9-11 ("In addition, in this system, the geometrical shape of the beams 12 is changed: instead of being circular they are now elongate ellipses.").* The application's written description further teaches that the invention's fan-shaped satellite beams will minimize handovers. *See id.* at lines 11-16 ("This considerably increases call durations between handovers.").

In contrast, Ruddy teaches that a ground station may use a single fan-shaped beam to transmit to a satellite in a unique Molniya orbit. The ground station transmits a beam into which a series of satellites in Molniya orbits will successively enter. At least two differences are evident: the application teaches projection of multiple beams from a satellite to the Earth, while Ruddy teaches projection of a single beam from the Earth to satellites. Moreover to the extent Ruddy contains a teaching about handovers, its teachings focus on use of the unique Molniya orbit to ensure that a satellite always falls within the beam transmitted by the ground station.

These differences suggest some difficulty in showing a *prima facie* case of obviousness. The Board, however, specifically found that artisans of ordinary skill in this field of art would know to shift the frame of reference from a ground station following a satellite to a satellite transmitting to the ground. According proper deference to the Board's finding \*1357 of a lofty skill level for ordinary artisans in this field, this court discerns no clear error in the Board's conclusion that these differences would not preclude a finding of obviousness. While Ruddy does not expressly teach alignment of the fan beam with the apparent direction of the satellite's motion, this court perceives no clear error in the Board's determination that Ruddy would suggest such an alignment to one of skill in this art. Therefore, the Board did not err in finding that the combination of King, Rosen, and Ruddy contains all of the elements claimed in Rouffet's application.

However, the Board reversibly erred in determining that one of skill in the art would have been motivated to combine these references in a manner that rendered the claimed invention obvious. Indeed, the Board did not identify any motivation to choose these references for combination. Ruddy does not specifically address handover minimization. To the extent that Ruddy at all addresses handovers due to satellite motion, it addresses this subject through the selection of orbital parameters. Ruddy does not teach the choice of a particular shape and alignment of the beam projected by the satellite. Thus Ruddy addresses the handover problem with an orbit selection, not a beam shape. The Board provides no reasons that one of ordinary skill in this art, seeking to minimize handovers due to satellite motion, would combine Ruddy with Rosen and King in a manner that would render the claimed invention obvious.

[13] Obviousness is determined from the vantage point of a hypothetical person having ordinary skill in the art to which the patent pertains. *See 35 U.S.C. § 103(a).* This legal construct is akin to the "reasonable person" used as a reference in negligence determinations. The legal construct also presumes that all prior art references in the field of the invention are available to this hypothetical skilled artisan. *See In re Carlson, 983 F.2d 1032, 1038, 25 U.S.P.Q.2d 1207, 1211 (Fed.Cir.1993).*

As this court has stated, "virtually all [inventions] are combinations of old elements." *Environmental Designs, Ltd. v. Union Oil Co., 713 F.2d 693, 698, 218 U.S.P.Q. 865, 870 (Fed.Cir.1983); see also Richdel, Inc. v. Sunspool Corp., 714 F.2d 1573,*

1579-80, 219 U.S.P.Q. 8, 12 (Fed.Cir.1983) ("Most, if not all, inventions are combinations and mostly of old elements."). Therefore an examiner may often find every element of a claimed invention in the prior art. If identification of each claimed element in the prior art were sufficient to negate patentability, very few patents would ever issue. Furthermore, rejecting patents solely by finding prior art corollaries for the claimed elements would permit an examiner to use the claimed invention itself as a blueprint for piecing together elements in the prior art to defeat the patentability of the claimed invention. Such an approach would be "an illogical and inappropriate process by which to determine patentability." *Sensonics, Inc. v. Aerosonic Corp.*, 81 F.3d 1566, 1570, 38 U.S.P.Q.2d 1551, 1554 (Fed.Cir.1996).

To prevent the use of hindsight based on the invention to defeat patentability of the invention, this court requires the examiner to show a motivation to combine the references that create the case of obviousness. In other words, the examiner must show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed.

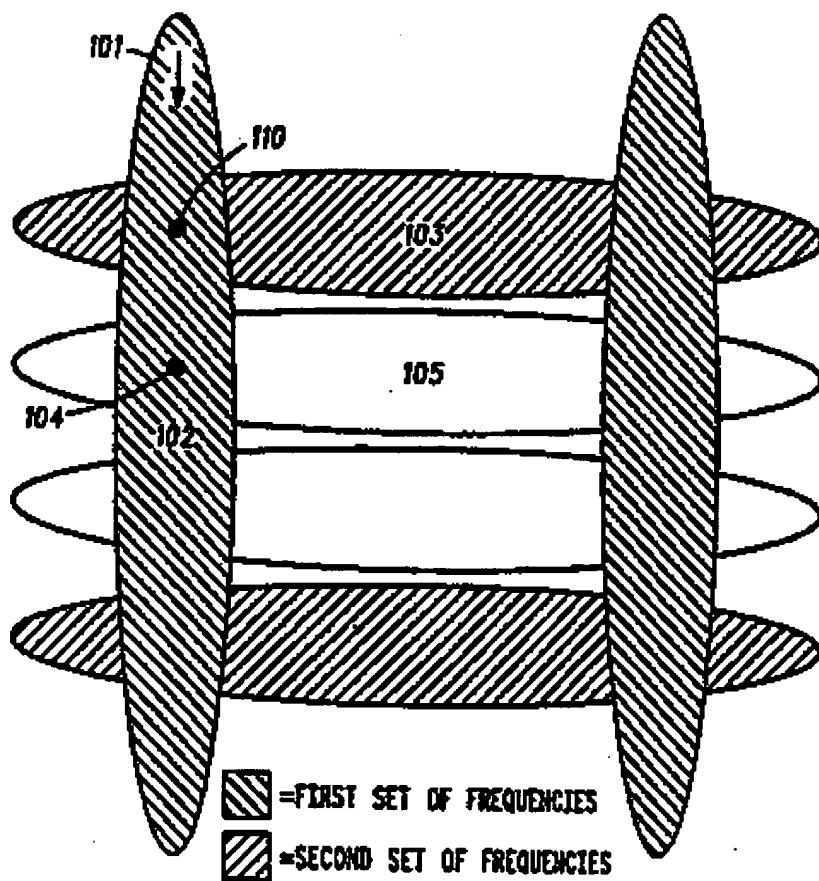
This court has identified three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art. In this case, the Board relied upon none of these. Rather, just as it relied on the high level of skill in the art to overcome the differences between the claimed invention and the selected elements in the references, it relied upon the high level of skill in the art to provide the necessary motivation. The Board did not, however, explain what specific understanding or technological principle within the knowledge of one of ordinary skill in the art would have suggested the combination. Instead, the Board merely invoked the high level of skill in the field of art. If such a rote invocation could suffice to supply a motivation to combine, the more sophisticated scientific fields

would rarely, if ever, experience a patentable technical advance. Instead, in complex scientific fields, the Board could routinely identify the prior art elements in an application, invoke the lofty level of skill, and rest its case for rejection. To counter this potential weakness in the obviousness<sup>\*1358</sup> construct, the suggestion to combine requirement stands as a critical safeguard against hindsight analysis and rote application of the legal test for obviousness.

Because the Board did not explain the specific understanding or principle within the knowledge of a skilled artisan that would motivate one with no knowledge of Rouffet's invention to make the combination, this court infers that the examiner selected these references with the assistance of hindsight. This court forbids the use of hindsight in the selection of references that comprise the case of obviousness. See *In re Gorman*, 933 F.2d 982, 986, 18 U.S.P.Q.2d 1885, 1888 (Fed.Cir.1991). Lacking a motivation to combine references, the Board did not show a proper *prima facie* case of obviousness. This court reverses the rejection over the combination of King, Rosen, and Ruddy.

*The Combination of Freeburg and Levine.*

[14] Freeburg teaches a cellular radiotelephone system based on a constellation of low Earth orbit satellites that use conical beams to transmit from the satellite to both fixed and mobile Earth stations. Levine teaches an Earth-based cellular radio system that uses fan beams broadcast from antenna towers. Levine's elliptical footprints are aligned with the road grid. To increase the capacity of traditional ground-based systems through frequency reuse techniques, Levine teaches the use of antennas that broadcast signals with smaller footprints than the prior art system. Thus, Levine actually increases the number of overlap regions between cells and, hence, the number of potential handovers. Figure 1 of the Levine patent illustrates its alignment of beam footprints:



**F I G . 1**

\*1359 As a mobile unit (e.g., a driver using a car phone) moves though a succession of overlapping zones, Levine uses selection algorithms to determine which of the cells is aligned with the travel direction of the mobile unit. These algorithms then select this cell for use while continually monitoring intersecting cells in the event that the mobile unit changes direction.

Once again, this court notes significant differences between the teachings of the application and the Levine-Freeburg combination. The critical Levine reference again involves a beam from an Earth station without any reference to the "travel direction of [a] satellite." Moreover, Levine actually multiplies the number of potential handovers and then uses software to sort out the necessary handovers from the unnecessary. However, the Board explains the reasons that one possessing the lofty skills characteristic of this field would know to account for the differences between the claimed invention and the prior art combination. This court discerns no clear error in that reliance on the considerable skills in this field.

This court does, however, discern reversible error in the Board's identification of a motivation to combine Levine and Freeburg. In determining that one of skill in the art would have had motivation to combine Levine and Freeburg, the Board noted that "[t]he level of skill in the art is very high." As noted before, this observation alone cannot supply the required suggestion to combine these references. The Board posits that the high level of skill in the art overcomes the absence of any actual suggestion that one could select part of the teachings of Levine for combination with the satellite system disclosed by Freeburg.

As noted above, the suggestion to combine requirement is a safeguard against the use of hindsight combinations to negate patentability. While the skill level is a component of the inquiry for a suggestion to combine, a lofty level of skill alone does not suffice to supply a motivation to combine. Otherwise a high level of ordinary skill in an art field would almost always preclude patentable inventions. As this court has often noted, invention itself is the process of combining prior art in a nonobvious

manner. See, e.g., *Richdel*, 714 F.2d at 1579; *Environmental Designs*, 713 F.2d at 698. Therefore, even when the level of skill in the art is high, the Board must identify specifically the principle, known to one of ordinary skill, that suggests the claimed combination. Cf. *Gechter v. Davidson*, 116 F.3d 1454, 43 U.S.P.Q.2d 1030 (Fed.Cir.1997) (explaining that the Board's opinion must describe the basis for its decision). In other words, the Board must explain the reasons one of ordinary skill in the art would have been motivated to select the references and to combine them to render the claimed invention obvious.

The Board's naked invocation of skill in the art to supply a suggestion to combine the references cited in this case is therefore clearly erroneous. Absent any proper motivation to combine part of Levine's teachings with Freeburg's satellite system, the rejection of Rouffet's claim over these references was improper and is reversed.

#### IV

The Board reversibly erred in determining that there was a motivation to combine either the teachings of King, Rosen, and Ruddy or of Freeburg and Levine in a manner that would render the claimed invention obvious. Because this predicate was missing in each case, the Board did not properly show that these references render the claimed invention obvious. Therefore this court reverses the Board's decision upholding the rejection of Rouffet's claims. In light of this disposition, Rouffet's pending motion to remand the case to the Board for further consideration is denied as moot.

#### COSTS

Each party shall bear its own costs.

*REVERSED.*

149 F.3d 1350, 47 U.S.P.Q.2d 1453

#### Briefs and Other Related Documents ([Back to top](#))

- [1997 WL 33545154](#) (Appellate Brief) Brief for Appellants in *re Rouffet*, et al. (Oct. 14, 1997)Original Image of this Document with Appendix (PDF)

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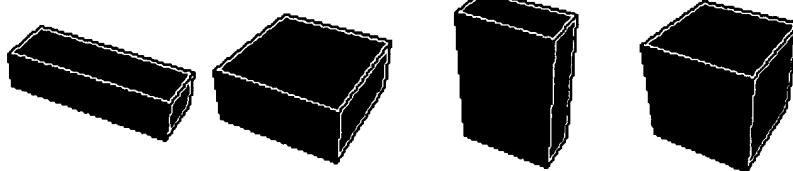
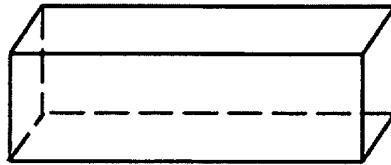
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## Cuboid

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A closed box composed of three pairs of rectangular faces placed opposite each other and joined at right angles to each other, also known as a rectangular parallelepiped. The cuboid is also a right prism, a special case of the parallelepiped, and corresponds to what in everyday parlance is known as a (rectangular) "box." Cuboids are implemented in *Mathematica* as `Cuboid[{xmin, ymin, zmin}, {xmax, ymax, zmax}]` by giving the coordinates of opposite corners. The monolith with side lengths 1, 4, and 9 in the book and film version *2001: A Space Odyssey* is an example of a cuboid.

Let the lengths of the sides be denoted  $a$ ,  $b$ , and  $c$ . A cuboid with all sides equal ( $a = b = c$ ) is called a cube, and a cuboid with integer edge lengths  $a > b > c$  and face diagonals is called an Euler brick. If the space diagonal is also an integer, the cuboid is called a perfect cuboid.

The volume of a cuboid is given by

$$V = abc \quad (1)$$

and the total surface area is

$$S = 2(ab + bc + ca). \quad (2)$$

The lengths of the face diagonals are

$$d_{ab} = \sqrt{a^2 + b^2} \quad (3)$$

$$d_{ac} = \sqrt{a^2 + c^2} \quad (4)$$

$$d_{bc} = \sqrt{b^2 + c^2}, \quad (5)$$

and the length of the space diagonal is

$$d_{abc} = \sqrt{a^2 + b^2 + c^2}. \quad (6)$$

**SEE ALSO:** Cube, Euler Brick, Parallelepiped, Prism, Spider and Fly Problem. [Pages Linking Here]

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## IATA PACKING INSTRUCTION 602 - 2001

STATE VARIATIONS: AUG-03, CAG-04, USG-13, VUG-02

OPERATOR VARIATIONS: AF-04, AS-02/08, CI-01, CO-07/08, CS-07, FX-09, SW-01, US-O8

The General Packing Requirements of Subsection 5.0.2 must also be met.

### General Requirements:

Shippers of Infectious substances must comply with these regulations and must ensure that shipments are prepared in such a manner that they arrive at their destination in good condition and that they present no hazard to persons or animals during shipment. The packaging must include:

- (a) inner packagings comprising:
  - (1) a watertight primary receptacle(s),
  - (2) a watertight secondary packaging,
  - (3) other than for large body parts and whole organs which require special packaging, an absorbent material which must be placed between the primary receptacle(s) and the secondary packaging. Absorbent material is not required for solid substances.

Multiple primary receptacles placed in a single packaging must be wrapped individually or for infectious substances transported in liquid nitrogen, separated and supported to ensure that contact between them is prevented.

The absorbing material, for example cotton wool, must be sufficient to absorb the entire contents of all primary receptacles.

- (b) an outer packaging of sufficient strength meeting the design type tests found in Subsection 6.5 and bearing the Specification Markings as required by 6.0.6 for shipments of infectious substances other than those containing large body parts and whole organs which require special packaging. Also infectious substances shipped on liquid nitrogen in packagings that meet the requirements of Packing Instruction 202 are excluded from the testing requirements of Subsection 6.5 and the marking requirements of 6.0.6.

Note: Packagings of the type known as "dry shipper" when used to ship infectious substances must meet the testing requirements of Subsection 6.5 and the marking requirements of 6.0.6.

Packages must be at least 100mm (4 in) in the smallest overall external dimension.

For all packages containing infectious substances other than those containing large body parts or whole organs which require special packaging, an itemized list of contents must be enclosed between the secondary packaging and the outer packaging. The primary receptacle or the secondary packaging used for infectious substances must be capable of withstanding, without leakage, an internal pressure which produces a pressure differential of not less than 95 kPa (0.95 bar, 13.8lb/in<sup>2</sup>) in the range of -40° C to + 55° C (- 40° F to 130° F).

All packages containing infectious substances must be marked durably and legibly on the outside of the package with the NAME and TELEPHONE NUMBER OF A PERSON RESPONSIBLE FOR THE SHIPMENT.

Shipments of Infectious Substances of Division 6.2 require the shipper to make advance arrangements with the consignee and the operator to ensure that the shipment can be transported and delivered without unnecessary delay. The following statement required by 8.1.6.11.2 must be included in the Additional Handling Information area of the Shipper's Declaration:

"Prior arrangements as required by the IATA Dangerous Goods Regulations 1.3.3.1 have been made."

**Specific Requirements:**

Although in exceptional cases, for example, the shipment of large body parts and whole organs, may require special packaging, the great majority of infectious substances can and must be packed according the following requirements.

Substances shipped at ambient temperatures or higher. - Primary receptacles may only be of glass, metal or plastic. Positive means of ensuring a leak-proof seal must be provided, such as heat seal, skirted stopper or metal crimp seal. If screw caps are used, these must be reinforced with adhesive tape.

Substances shipped refrigerated or frozen (wet ice, pre-frozen packs, carbon dioxide solid [dry ice]; ice, carbon dioxide solid (dry ice) or other refrigerant must be placed outside the secondary packaging(s) or alternatively in an overpack with one or more complete packages marked in accordance with 6.0.6. Interior support must be provided to secure the secondary packaging(s) in the original position after the ice or carbon dioxide solid (dry ice) has been dissipated. If ice is used, the packaging must be leak-proof. If carbon dioxide solid (dry ice) is used, the outer packaging must permit the release of carbon-dioxide gas. The primary receptacle and the secondary packaging must maintain their containment integrity at the temperature of the refrigerant used as well as at the temperatures and pressure(s) of air transport to which the receptacle could be subjected if refrigeration were to be lost

Substances shipped in liquid nitrogen: Plastic primary receptacles capable of withstanding very low temperatures must be used. Secondary packaging must also withstand very low temperatures and in most cases will need to be fitted over individual primary receptacles. Requirements for shipment of liquid nitrogen must also be observed. The primary receptacle must maintain its containment integrity, at the temperature transport to which the receptacle could be subjected if refrigeration were to be lost. Where multiple primary receptacles are contained in a single secondary packaging, they must be separated and supported to ensure that contact between them is prevented.

Lyophilized substances: Primary receptacles must be either flame-sealed glass ampoules or rubber-stoppered, glass vials with metal seats.